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ABSTRACT

This document contains abstracts of approximately 300 papers presented at the 1967 annual meeting of the American Educational Research Association. A sampling of the varied subjects covered includes: dynamics of the school board role, concept learning, programed instruction, administrative behavior and organizational characteristics, correlates of academic performance and achievement, subordinate-superordinate relationships, development of reading ability, test construction, language behavior and development, studies of teachers of culturally disadvantaged children and youth, nonparametric techniques, group relationships and behavior, computer applications, and reading interests and treatment of disabled readers. A topical index of the papers and an index of participants conclude the collection. Related documents are EA 002 791, EA 002 792, and EA 002 794. (DE)

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AMERICAN EDUCATIONAL
RESEARCH ASSOCIATION

PAPER ABSTRACTS

Editor
ELLIS B. PAGE

Paper Sessions of the

1967 ANNUAL MEETING

NEW YORK CITY
STATLER-HILTON HOTEL
FEBRUARY 16-18

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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EDITOR'S COMMENT

Presented here are the *Abstracts* of the Contributed Papers which were accepted for presentation at the 1967 Annual Meeting of the American Educational Research Association, in New York at the Statler-Hilton Hotel, February 16-18. It is the largest meeting in the history of the A.E.R.A., and the present publication is the most ambitious in the brief history of the printed *Abstracts*. The Annual Meeting of 1965 marked the first availability of the abstracts, and the venture was successful enough to encourage expansion. In 1966, under the Editorship of Robert M. W. Travers, the permitted length of abstract was increased from 100 to 250 words, and an improved lithography was employed. This present publication, based upon the increased size of the Annual Meeting and of the A.E.R.A. itself, introduces further polish in format, with standard printing and several type-faces. In size it is also the largest. From 53 paper sessions in 1966, the present volume includes over 70 scheduled sessions, and almost 300 individual papers. Of course, not all of the Annual Meeting is here presented: symposia, special addresses, and other functions are not included.

A large number of Members have contributed to these *Abstracts*. The President Julian C. Stanley and Executive Officer Richard Dershimer have worked tirelessly to create the best possible organizational climate, from which the Annual Meeting inevitably takes its character. And the members of the Program Committee, listed on the following page, have done fine work in supervising the divisional evaluations of the contributed papers, which make up the substance of this volume. These division teams, to whom we owe great thanks, are the principal quality control agents for the Annual Meeting. We are also indebted to Louise Patros and Michael J. Zicky, for assistance with proofreading indexing, and editing.

In order to indicate proper responsibility and credit, the *Abstracts* and the *Program* for the first time will list the sponsoring Division, or other agency, for each event in the Annual Meeting. It thus becomes obvious that the Divisions are not identical in their representation here, nor in their research activity. The differences may reflect the variable conditions of educational research in the national scene, just as the total growth in these published *Abstracts* may reflect the overall, increasing vitality of the discipline embodied in our organization.

Ellis B. Page
A.E.R.A. Program Chairman, 1966-67
University of Connecticut, Storrs

January, 1967

The A.E.R.A. Paper Abstracts for 1967

The following abstracts are arranged in order of presentation during the Annual Meeting. They include only those contributed papers submitted to the Divisional Program Chairman, and accepted by the evaluation teams. In most cases they are as written by the authors, but in some abstracts changes have been made to shorten the prose to an acceptable length, or to make greater consistency in reporting practices.

SPECIAL NOTES: The person reading the paper will usually be the first author listed. Where someone else was scheduled to read it, he will be denoted by an asterisk (*).

At times papers are written and presented by researchers who are not Members of A.E.R.A. In such cases, the name of the Member Sponsor will appear, in parentheses, after that of the author.

Session numbers are not in a complete series. They are rather used to designate certain time blocks, and many numbers are not used at all.

9:00 to 9:50 A.M. SESSION 6 DIVISION A

DYNAMICS OF THE SCHOOL BOARD ROLE

CHAIRMAN:

Russell T. Gregg, University of Wisconsin

PAPERS:

School District Innovativeness and Expectations for the School Board Role

JAMES C. LAPLANT, George Peabody College for Teachers

This investigation was based upon an application of social systems theory to the school organization. A basic question was whether or not agreement within and between groups who have expectations for the school board role is related to the number of new educational practices adopted, the earliness of adoption, and the rate of diffusion within the school system after adoption.

Expectations data, collected in interviews in twelve school districts, were analyzed to determine the degree of consensus within and between the four groups in each district. Data for the innovativeness measures were collected in joint interviews with the superintendent and a long tenure administrator in each district.

Relationships were found between the degree of consensus between citizens and teachers and the number of innovations adopted as well as the earliness of adoption. Ancillary findings included positive relationships between district size and the number of innovations adopted and between the rate of diffusion within a district and per pupil expenditures.

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Expectations for the School Board Role and Financial Support of the Schools

JOHN R. THORSON, Cuyahoga Heights Public Schools, Cleveland, Ohio

This study examined relationships in selected school systems between (1) the level of expectations for the financial aspects of the school board role and the level of local financial support for the schools, and (2) the level of expectations for selected expenditures and the allocation of expenditures by the school board. The rationale for this investigation stemmed from role theory concerning conflict in expectations, and from research concerning the position of the school board in society.

Among the more relevant conclusions were: 1. Holding preferences for particular school programs and being willing to pay for them may not be the same. 2. There may be a difference between responding favorably toward financial support for schools in an interview, and an actual financial commitment for them. 3. Expectations for expenditures may not exist as a single identifiable concept. There appears to be no "all-out" support for schools, but citizens seem to discriminate between what they will support. 4. The lack of a consistent relationship between the major variables suggests two possibilities: (a) there is a lack of perception by board members of outside expectations for the school board role, or (b) financial decisions are not effectively within the control of the local school board, and are therefore not really controlled by expectations held by local citizens.

* * *

Personal Values of School Board Members and Satisfaction With the School Board Role

RAYMOND O. LARSON, Middleton, Wisconsin

The purpose of this study was to determine whether or not any relationship existed between the values and belief systems of school board members in selected Wisconsin school districts and the satisfaction they derived from their school board role.

The school board members of twelve Wisconsin school districts comprised the sample for this study. The *Study of Values* was employed to measure the relative prominence of six basic motives in personality; the theoretical, economic, aesthetic, social, political, and religious. Open-closed mindedness was measured by administering the Haiman scale, a derivation of the California F Scale, the Rokeach Dogmatism Scale, and several items developed by Haiman. A satisfaction scale was administered to measure the personal satisfaction each board member derived from each of ten school board functions.

No significant relationships were found between the values held by board members and the satisfaction they derived from the school board role. Nor was a significant relationship found between open or closed mindedness and satisfaction derived from the school board role. However, when the individual members of a school board were congruent in their belief systems (whether open or closed) they expressed significantly more satisfaction with the school board role than did the individual members of a school board whose members evidenced disagreement in beliefs. Theoretical and aesthetic values correlated negatively with closed mindedness while economic and religious values correlated positively with closed mindedness.

Expectations and Satisfactions of Effective and Ineffective School Board Members

ALAN D. OSTERNDORF, Menasha High School, Wisconsin

The major purpose of this study was to analyze differences between effective and ineffective school board members with respect to the nature and consensus of their expectations for the schools, expectations for the internal operating procedures of the school board, and satisfaction with the public schools of the district.

The study was conducted in twelve Wisconsin school districts. School board members who were nominated two or more times by their peers on individual boards as most effective or least effective provided the sample of 23 effective and 17 ineffective members.

1) There were no statistically significant differences between effective and ineffective school board members with respect to the nature of their expectations for the schools, the nature and consensus of their expectations for the internal operation of the school board, and the nature and consensus of their satisfaction for the public schools of the district. Effective board members had significantly more consensus than ineffective board members with respect to expectations for the schools; 2) An analysis of the responses of the two groups of board members to each of the 53 items utilized in the study resulted in statistically significant differences for only two of the items; 3) Effective board members were more often presidents of their local school boards than were ineffective members; 4) Effective board members, as perceived by their peers, appeared to be of one general type while ineffective board members tended to be of three types.

9:00 to 9:50 A.M. **SESSION 7** **DIVISION C**

CONCEPT LEARNING: I

CHAIRMAN:

Thomas J. Johnson, Washington University, St. Louis

PAPERS:

Outcomes of a Computer Model of Concept Attainment

FRANK B. BAKER, University of Wisconsin

A model of the concept attainment process has been developed utilizing the technology of computer programming. The modeling process has indicated that the concept attainment process can be considered to consist of two hierarchical networks of behavior. One network is associated with the higher level cognitive processes involved in the selection of behavior, maintenance of goal-directedness, and evaluation of behavior. The second and parallel net is the operational net consisting of behaviors which can be used to perform the information processing tasks associated with concept attainment. The procedures in the first net have been labeled "contexters" as they are situationally dependent and essentially establish a context within which the operational routines function.

At the current time the computer model has reached a plateau in its development due to both a lack of fundamental knowledge of higher level cognitive processes and the limitations of current psychological investigative techniques. If the modeling process is to proceed, research into several areas will need to be subjected to intensive psychological inquiry at a level of detail far exceeding current levels. The remainder of the paper will delineate these areas of research and relate them to the needs of the existing computer model.

* * * *

The Effect of Stimulus Generalization in Concept Formation Studies.

NORMAN P. UHL, Emory University.

Several experiments investigating transfer-after-discrimination training have been performed, demonstrating faster acquisition of intradimensional (IN) than extradimensional (EX) shifts with adults and children above kindergarten age as *S*s. The reverse has been observed with younger children and animal *S*s. The faster acquisition by adult *S*s of IN shifts has been interpreted in terms of mediational or two-stage theories of discrimination learning, which assume that acquisition of some mediating response precedes the acquisition of instrumental choice responses, therefore predicting that faster learning will occur when the mediating response is relevant in both the training and transfer problems (IN shifts) than when it is not (EX shifts). Several studies have used different stimuli but the same dimensions in the transfer problem to avoid problems of partial reinforcement. In these studies it would be predicted that the mediating response would be weakened through stimulus generalization making an IN shift more difficult and an EX shift easier, than when the stimuli on the training and transfer problem are identical. This study tests this prediction using a 3x2x2x2 factorial design. Subjects were 266 introductory psychology students. The independent variables were the relevant training dimension (color or alphabet), shift (IN or EX), and stimulus similarity between the training and transfer task on both the color and alphabet dimensions.

* * * *

On the Configuration of Subject Matter

RONALD D. THURNER and PAUL E. JOHNSON, The University of Minnesota

This paper presents an analysis of continuous word association data for concepts in the relatively stable subject matter domain of Newtonian Mechanics. A measure of overlap was computed for the distributions of responses to pairs of concepts in the subject matter. These measures were interpreted as a set of proximity scores and were reduced to n-dimensional configurations (where n is less than the number of concepts present) by means of multidimensional sealing procedures. Two-dimensional configurations were analyzed as a function of both competence and experience in the subject matter and a relationship was found between distance measures among concepts in the configurations and the frequency of occurrence of words which represented the concept in the written instruction of the subject matter. The nature of the relationship between these configurations and the logical configuration of concepts in the subject matter of mechanics is discussed.

* * * *

A Comparison of the Effect of Equilibration Theory- and S-R Theory-Based Training on the Acquisition and Permanence of Conservation of Weight

GARY B. STUCK, University of North Carolina, and
LAURENCE D. BROWN, Indiana University

The present study was an attempt to investigate the relative effect of two types of concept training, S-R reinforcement and equilibration, on the acquisition and permanence of conservation of weight. The data consisted of pre- and post-test scores on measures of conservation of mass and weight administered to 54 second and third year elementary school students. Additional data were obtained from a "trials-to-extinction" measure administered to 21 of the original 54 *S*s. The *S*s, non-conservers or "transitional" conservers of weight, were assigned to one of three groups: the S-R reinforcement training group, the equilibration training group, or the no-training control group. Basically, both training methods were designed to foster understanding of the weight conservation principle that a change in shape does not produce a change in weight. However the S-R group received immediate reinforcement after predicting the relative weights of training objects while the reinforcement for the equilibration group was considerably delayed and less direct. A post-test again measured conservation of weight and a final post-test assessed the permanence of the *S*s' conservation concepts. As a result, the authors noted the following: (1) significantly more transitionals than complete non-conservers of both mass and weight became conservers of weight during training; (2) only the S-R group differed significantly from the control group on initial post-test scores for conservation of weight; and (3) no significant differences were found between the experimental groups on the measure of permanence of conservation beliefs.

9:00 to 9:50 A.M. **SESSION 8** **DIVISION C**

PROGRAMMED INSTRUCTION: I

CHAIRMAN:

Philip R. Merrifield, Kent State University

PAPERS:

A Procedure for Sequencing Self-Instructional Material for Attainment of Concepts

William L. Hull, Oklahoma State University

The study developed and tested a factor analysis procedure for sequencing self-instructional materials associated with concept attainment of human relations skills and abilities. The effect of the computer generated "psychological" sequence was compared with a random sequence of concept. The effect of sequence on sequential decision-making and three achievement levels of students was determined.

Self-instructional booklets containing 10 concepts were developed with two types of criterion questions: (1) specific to the case illustrating the concept, and (2) generalizations relating to the concept. All booklets were identical except for concept sequence.

The psychological and random sequences were assigned randomly to 294 vocational agriculture juniors and seniors in 15 high school districts. Reading comprehension test scores and human relations aptitude test scores were used as covariates in a balanced subgroup analysis of the covariance design.

Students using the psychological sequence had higher mean scores than students using the random sequence in all comparisons except one. At the .05 level, low achievement students showed significant differences on specific questions while high achievement students showed significant differences on general questions in favor of the psychological sequence. Evidence in the study suggests the hypothesis that sequence becomes more important as difficulty of the material increases.

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Interference as a Function of Order in Problem Labelling

Neil Sullivan, Barbara Pennington, Patricia Wilkie, and
M. C. Wittrock, University of California, Los Angeles

The purpose of the study was to determine the effects of label positioning and indicated difficulty level on sequential problem solving. Each of the 860 frames of an introductory geography program was labelled hard, easy, or average, determined on a random basis. In treatment 1, the labels were placed at the beginning of each frame; in treatment 2, after the KCR; in treatment 3, at both positions. The control condition had no labels within the program.

Sixty third-grade students were individually and randomly assigned to one of the three treatments or to the control. The subjects progressed at their own pace through the geography program, taking each of the eleven internal tests at specified intervals. After completion of the program, subjects were given a learning posttest and an attitude questionnaire. Two days later, a label preference test and a rigidity measure were administered to all subjects.

Subjects in treatments 1 and 3 did significantly better on the learning posttest than did subjects in treatment 2. They also made significantly different choices on the label preference test.

It is postulated that subjects receiving labelling at the beginning of a frame are able to rationalize the discrepancy between the indicated difficulty and perceived difficulty of the frame. Subjects receiving labels after the KCR do not have time to resolve this discrepancy before beginning the next frame. This residual cognitive dissonance carries to the next frame resulting in a decrement in performance.

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Utilization of an Intrinsic Program to Study the Problem Solving Processes of Gifted and Average Children

JOHN P. CASEY, Southern Illinois University

The purpose of this experiment was to utilize an intrinsic program to study differences between gifted and average pupils in their problem solving processes and products. Specifically, null hypotheses were tested to discover if gifted and average pupils differed in their gain scores, time required to complete program, number of units of information acquired, and initial decisions in selection of sequences.

Forty gifted and average eleventh and twelfth grade pupils, University High School, Southern Illinois University, identified by the School and College Ability Test and matched on pretest scores were asked to follow a section of an intrinsic program. (How to find a periodical in the University Library.) Included in the intrinsic program were frames which asked the subjects to select difficult, average difficult, or easy sequences. Chi square and "t" test for correlated samples were used to test the null hypotheses.

The results of the study were that gifted and average subjects differed significantly (.05) in their gain scores, but did not differ significantly in time required to complete the program, number of information units selected, and in their initial decisions.

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The Relative Importance of Verbal Intelligence, Verbal Creativity and Anxiety as Contributors to the Prediction of Sixth Graders' Achievement with Programmed Instructional Materials

ROBERT P. O'REILLY and RICHARD E. RIPPLE, Cornell University

A total of 165 sixth graders received ten periods of instruction from a linear program. Subjects were pretested on anxiety, intelligence, verbal creativity and achievement in the material taught in the program. After instruction *S*s were readministered the tests of anxiety, creativity and achievement. The independent variables were *z* scores on anxiety, pretest achievement, IQ, sex, four creativity subtests, and nine interaction scores calculated from the *S*s' *z* scores on the linear independent variables.

A step-wise regression analysis was used to assess the relative contributions of the 17 independent variables to posttest achievement scores. The beta weights for IQ, pretest achievement, anxiety and the interaction of originality with IQ were significant when combined in the multiple regression equation. Comparisons of the weights of these predictors show that IQ and pretest achievement are equally important as contributors to the prediction of achievement. The weight for anxiety is negative, with a ratio of roughly 1.0:3.5, relative to the positive weights for IQ and pretest achievement.

A causal model showing the relative effects of the independent variables, IQ, pretest achievement and anxiety is proposed, and the implications of the findings for the use of commercial programs in the classroom are discussed.

10:00 to 10:50 A.M. **SESSION 11** **DIVISION A**

STUDY OF ADMINISTRATION BEHAVIOR AND ORGANIZATIONAL CHARACTERISTICS

CHAIRMAN:

Richard Carlson, University of Oregon

PAPERS:

Bureaucratization of School Districts and Teacher Autonomy

JOANNA JENNY SAMUELS, University of California, Los Angeles

The relationship between bureaucratization of school districts and the professional autonomy of elementary classroom teachers was investigated. Three dimensions were included in the conceptualization of teacher autonomy: (1) scope for decision-making, (2) extent to which teaching activities were standardized, and (3) use of product versus process criteria in evaluating teacher success.

Data for the study were collected by means of questionnaires sent to 1,887 teachers representing 224 elementary schools located in 13 school systems ranging in size from an average daily attendance of 2,431 to 83,101. Questions related to the teacher's scope for decision-making, the type of review he encountered, and amount of standardization of his teaching activities were included.

Analysis of indicators of teacher autonomy by school district size revealed the following significant relationships: the larger the district, the lower is the teacher's scope for decision-making in the classroom ($p < .001$) and the lower is the teacher's scope for decision-making in the district ($p < .001$). Larger districts provided more standardizing devices such as teaching guides and pre-planned teaching units.

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The Relationship Between Teacher Morale and Organizational Climate

JÁNOS B. KOPLYAY and B. CLAUDE MATHIS, Northwestern University

The purpose of this investigation was to ascertain what relationships, if any, exist between teacher morale and organizational climate. In a study of the validity of the Chandler-Mathis Attitude Inventory (a test of teacher morale reported in the literature), data were obtained on the organizational climates of the schools involved through the use of the Organizational Climate Description Questionnaire. The study involved 299 elementary school teachers and 17 schools. The portion of the data reported here attempted to determine the relationship between teacher morale, the organizational climates, and type of salary schedule. Subtests on the Inventory were compared to the climates and to the type of salary schedule through an analysis of variance procedure. The results supported the conclusion that the morale level of a school is significantly related to the organizational climate of the school. The morale level of a school appeared to have a greater relationship to organizational climate than to the type of salary schedule (merit, non-merit). Schools with an open climate did not differ significantly on any of the attitudinal areas of the Inventory. Schools with a closed climate did differ significantly on four of the five subtests (School, Policy, Community, and Administration). These differences were greatest for merit-salary schools.

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A Factor Analytic Study of Personality Characteristics of Teachers in Open and Closed Educational Organizations

JAMES B. KENNEY, HAROLD W. GENTRY, and WILLIAM F. WHITE,
University of Georgia

From an urban population of 1,145 female elementary teachers, two groups were identified by scores on the Organizational Climate Description Questionnaire (OCDQ): (A) Teachers (N = 26) who perceived the climate of their school as "open" and were in a school system classified as "open." (B) Teachers (N = 35) who perceived the climate of their school as "closed" and were in a school classified as having a "closed climate." Personality factors, as measured by the Sixteen Personality Factor Questionnaire, were assessed for teachers in both groups.

Results indicated that although the rotated factor structure for both groups was quite similar, a reversal of the second order factors of anxiety and extroversion-introversion occurred between open and closed groups. Teachers in closed climates were significantly more anxious and extraverted than were teachers classified in open organizational climates. A discussion of the findings with relations to the organization of the schools and implications for staffing are included in the paper.

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The Relationship Between Principals' Behavior, Role Orientations, and Perceived Expectations of Two Reference Groups

RICHARD A. GORTON, Madison (Wisc.) Public Schools, and
NORMAN J. BOYAN, Stanford University

The study tested whether principals' behavior is independent of their role orientations and of their perception of the expectations of relevant reference groups.

The behavior studied was encouragement of teacher participation in decision-making. One-hundred randomly selected principals served as subjects. A ten per cent random sample of teachers served as reporters of principal behavior. Immediate superiors also reported their actual expectations for principal behavior.

Multi-variate statistical procedures were used for data analysis. Zero-order correlations were as follows: behavior and role orientation, $r = .49$ ($p < .01$); behavior and perceived faculty expectations, $r = .43$ ($p < .01$); behavior and perceived expectations of immediate superiors, $r = .49$ ($p < .01$). Partial correlations were as follows: behavior and role orientations, $r = .30$ ($p < .01$) and $r = .25$ ($p < .05$); behavior and perceived expectations of faculty, $r = .18$ ($p > .05$); behavior and perceived expectations of immediate superior, $r = .25$ ($p < .05$). The multiple correlation between behavior and all predictor variables was .55 ($p < .01$). The results provided support for the hypotheses, but also indicated that other variables materially influence principals' behavior.

The zero-order correlation between principals' behavior and actual expectations of immediate superiors was .39 ($p < .01$). The partial correlation for actual expectations was .28 ($p < .05$), revealing that actual expectations were associated with behavior as much as perceived expectations. The results suggest the need for further investigation of the relative utility of perceived vs. actual expectations as independent variables in analyses of administrator behavior in education.

10:00 to 10:50 A.M. **SESSION 12** **DIVISION C**

REINFORCEMENT AND LEARNING

CHAIRMAN:

Richard Bloomer, University of Connecticut

PAPERS:

A Comparison of Immediate and Delayed Reinforcement Groups with Respect to Retention of Knowledge

Kathryn B. Daniel, University of South Carolina, and
Barbara Witchel, Newark State College

This study is the first in a series which investigates immediate and delayed reinforcement treatment on retention of students with respect to knowledge of test results. Continuing studies are being made in which the time interval variable is manipulated. The problem of the investigation was to determine the effects on retention of statistical concepts between two groups of subjects (college juniors), an immediate reinforcement group and a delayed reinforcement group.

Both groups were presented identical lecture material by the same instructor and knew they were responsible for the material covered. One week after the presentation of the material both groups were tested. The immediate reinforcement subjects graded their papers upon completion of the examination while the delayed reinforcement group waited one week to receive knowledge of test results. A time interval of two weeks elapsed for both groups before they were retested.

An analysis of variance was performed on the difference in scores obtained from the two tests taken by each group; an F-ratio of 8.07, statistically significant beyond the .01 level of confidence, was obtained. The mean of the differences for the immediate reinforcement group was 1.76 and 4.3 for the relayed reinforcement group.

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Stimulus Constancy and the Effect of Reinforcement in a Pseudo Concept Identification Task

John W. Cotton and Mitri Shanab,
University of California, Santa Barbara

Four groups of 20 *S*s were given 160 trials of guessing whether a successive stimulus card would be a "+" or "−". Groups were labelled 1:1/3, 1:5/7, 4:1/3, and 4:5/7, respectively, depending upon the number of dimensions on which the stimuli varied and on the proportion of stimulus elements constant for all stimulus cards. The correct answer on any trial was independent of the stimulus and of the response, being "+" with probability 1/2 and "−" otherwise. The response measure was p_k, the probability that *S* would "copy" the last previous correct answer as a function of the number (k) of dimension values unchanged between the previous and current trials.

Results. The value of p_k increased significantly with increased k, showing that increased similarity leads to increased "copying". When only $k = 0$ and $k = 1$ are considered, p_k is significantly higher for the 1 dimension groups than the 4 dimension groups. Constancy yielded no significant main effect. In a similar study Shaffer and Remple had shown that p_k is less than .50 for $k = 0$ and is not a linear function of k, two contradictions of theorems from Estes and Burke. The present experiment confirms their second finding but only partially confirms the first finding.

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Verbal Satiation of a Reinforcer in Pre-School Children

Harold Cook, Claude Hill, John Emrick, and M. C. Wittrock,
University of California, Los Angeles

The experiment investigated satiation of a verbal reinforcer on performance of an operant. Satiation implies a loss of meaning or reduction in the effectiveness of any stimulus following its continued repetition. It was hypothesized that satiation should reduce the effectiveness of a verbal reinforcer.

Sixty pre-school children were randomly assigned to treatments in a 2x2x5, fixed effect, factorial design. The factors were (1) reinforcer, ("good" or "plant"), (2) satiator, ("good" or "plant"), and (3) duration of repetition, (20, 15, 10, 5, and 0 seconds).

In a free operant task involving dropping marbles into either of 2 holes, a right or left response preference was determined for each S. The satiation phase involved each S continually repeating aloud "good" or "plant". In the reinforcement phase, each S was verbally reinforced by E ("good" or "plant") for each marble drop response to the low-preference side. The dependent variable was the increase of responses to the low-preference side.

The analysis of variance showed a significant linear trend for duration of repetition ($P < .05$).

Trend analysis indicated that each satiation-reinforcement condition produced, across the levels of satiation, a unique "S" shaped cubic curve. These 4 curves intersect and overlap ($P < .01$).

The results indicate that satiation (duration of continual repetition of a word) functions to decrease the effectiveness of a verbal reinforcer in young children.

Learning from Prose Material: Length of Passage, Knowledge of Results, and Positions of Questions

LAWRENCE T. FRASE, University of Massachusetts

Knowledge of results (KR) was given or withheld following specific questions which occurred either before or after prose passages taken from Miller's *Psychology: the science of mental life.* The prose passages were either 10, 20, or 40 sentences long. Seventy-two introductory educational psychology students participated. Results of a 2 x 3 x 2 factorial analysis on retention of 20 questions used in the reading task and on 20 questions relating to other (incidental) portions of the prose material replicated research showing that short tests, even without KR, facilitate retention. Tests may, however, interfere with the acquisition of information incidental to the specific test questions if those questions occur before the prose passages. Presenting specific questions after the passages facilitated retention scores *and* scores on incident material. The 20-sentence length was optimal for retention scores while incidental material tended to improve with length of passage. KR facilitated retention test scores but did not influence scores on incidental material. Results indicate that questions, rather than a search for KR, have facilitating effects upon performance. The study bears directly upon similar research by Rothkopf, and is relevant to Berlyne's views on epistemic curiosity and suggestions from Smith & Smith concerning a cybernetic approach to reading behaviors.

10:00 to 10:50 A.M. **SESSION 13** **DIVISION E**

CORRELATES OF ACADEMIC PERFORMANCE

CHAIRMAN:

Joan Bollenbacher, Cincinnati Public Schools, Ohio

PAPERS:

The Relationship Between Home Background, School Success and Attitudes of High School Students

FOREST I. HARRISON, Claremont Graduate School, and
GEORGE F. MADAUS, New England Catholic Education Center, Boston College

A sample of 1,156 tenth graders from a suburban Chicago school district was screened to form four groups: 1. Advantaged home backgrounds and academically successful; 2. Disadvantaged home background and academically unsuccessful; 3. Advantaged home background and academically unsuccessful; 4. Disadvantaged home background and academically successful.

Four attitudinal scales and a measure of style of resolution of role conflict were developed for the study. A 2 x 2 (home background-by-school performance) multivariate analysis of variance was employed in the analysis.

The following results were obtained: 1. Attitude toward education in general was not related to home background or school performance. 2. Attitude toward school in particular also was unrelated to group membership. 3. The disadvantaged successful student has the most optimistic view of his environment. 4. Success in school is related to whether one's peer group values education. 5. The more successful students significantly more often consider general norms in resolving role conflicts, while their unsuccessful peers consider who is involved in the conflict situation.

These and other findings are discussed in the light of the "conception" model of social behavior underlying the study.

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Classroom Behavior and School Achievement: A Longitudinal Study

JOHN F. FELDHUSEN, Purdue University,
JOHN R. THURSTON and JAMES J. BENNING,
Wisconsin State University–Eau Claire

Do children who are aggressive and disruptive in school achieve at lower levels than children who behave in socially acceptable ways? A total of 1,109 children were nominated by third and sixth grade teachers as persistently displaying aggressive and disruptive (disapproved) or socially acceptable (approved) behavior. A sample of 200 was drawn, divided equally by behavior status (approved or disapproved), grade (3 or 6), and sex, for a concurrent study of behavior and standardized achievement test performance, a sample of 88 for a longitudinal study of teacher grades four years later, and a sample of 40 for a longitudinal study of STEP scores four years later. An analysis of covariance design, with IQ as the covariate, was used. The independent variables were behavior, grade, and sex. The concurrent study revealed that the mean achievements in reading and arithmetic of the disapproved sixth graders were lower than the means for approved sixth graders. The longitudinal studies revealed that four years later in seventh and tenth grades respectively, the STEP means and the mean teacher grades in English and arithmetic were lower for the disapproved children than for the approved. Three alternative theoretical explanations were discussed.

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Motivational Variables Related to College Under-Overachievement and Voluntary Dropout

HORACE B. REED, Skidmore College

The purpose of the research was to explore several hypotheses relating student motivations in a college environment to criteria of voluntary dropout and of under-overachievement. A sample of 343 freshmen from a women's college provided the data on motivations through a 56-item College Assessment Inventory. On the basis of chi square and analysis of variance tests, 21 of the items were identified as significantly related as hypothesized to one or the other criteria (.05 level or better). Items measuring *relevance of college to students' future goals* and items for *warmth of interpersonal relations* predicted voluntary dropout. Items for *meaningfulness of daily college tasks* predicted overachievement. Students choosing liberal arts rather than professional fields had significantly higher attrition, while the mean under-overachievement scores were similar; there was marked variability among specific fields with both criteria. Separate items for other motivational variables were also identified to be significantly related to the criteria. The content of specific College Assessment Inventory items may provide clues to practical applications for institutional modifications aimed at reducing attrition and increasing achievement.

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College Student Attrition

ROBERT J. PANOS, American Council on Education

A recent follow-up survey of a 1961 national sample of freshman classes at 246 accredited four-year colleges and universities shows that 65 per cent of the students had completed four or more academic years of higher education as of August 1965. Of the 60,000 students surveyed, 41 per cent had received no terminal degrees. Over 44 per cent of the students had either dropped out or transferred from the college they had initially attended in the fall of 1961. These data indicate the need for alternative methods of defining the college drop-out.

In this paper alternative definitions of the college drop-out criterion are presented and examined with regard to both student personal background characteristics and institutional environmental factors. Personal and pre-college variables include such characteristics as race, religion, and socio-economic background. Institutional variables include such factors as institutional "type" characteristics and institutional intellectual and social orientations. The relationship between these empirical measures and college student attrition is presented and evaluated.

11:00 to 11:50 A.M. **SESSION 23** **DIVISION D**

STUDIES OF CHANGE

CHAIRMAN:

Desmond L. Cook, The Ohio State University

PAPERS:

A Corrected Measure of Residual Change

Ross E. Traub, The Ontario Institute for Studies in Education

(Leslie D. McLean)

The change which occurs over time in a psychological variable is sometimes assessed by a residual score, say G. In this theoretical paper, it is shown that G is not an unbiased estimate of its corresponding true residual score because the slope of the linear regression of the postmeasure on the premeasure of the variable of interest, a constant used in the computation of G, is attenuated by error of measurement in the premeasure. The regression constant may be corrected by dividing it by the reliability of the premeasure. This corrected regression constant may then be used to compute a corrected residual score, say G_c which is shown to be an unbiased estimate of its corresponding true residual score. G_c is also shown to have the following properties: (1) the reliability of G_c may be estimated from its correlation with a parallel corrected residual scores; (2) the correlation between G_c and another variable may be corrected for attenuation due to error in G_c by dividing the correlation by the square root of the reliability of G_c; and (3) the correlation between G_c and true scores on the premeasure is O. G is shown to have none of these properties. Hence G_c appears to be a theoretically more satisfactory residual score than G.

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Mental Abilities: A Factor-Analytic Study of Change

Marion F. Shaycroft, American Institutes for Research
and University of Pittsburgh

About 7,500 students who took the Project TALENT battery in grade 9 were retested three years later, in grade 12, with parts of the same battery. Factor analysis of 95 variables (scores on 47 aptitude, ability, and achievement tests in grade 9, the same 47 measures in grade 12, and a socioeconomic index) demonstrates the utility of this sort of analysis, where parallel measures are obtained at two different times, with a long interval between, as a source of new insights into the organization of mental abilities, and the nature of changes in relative score that occur during the interval. The most striking result, in this connection, is the appearance of "change" factors which supplement (*and are uncorrelated with*) factors representing initial ability (i.e., ability in grade 9). These change factors probably are partly due to differences among high schools in kind and quality of education provided.

The results reveal 40 common factors. Since all 40 are interpretable, they are probably all significant, even though that many common factors seldom result from a factor analysis.

There are separate factor analyses for boys and girls. The results are very similar for the two groups, except where differences would be expected.

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Changes in Response Patterns While Rating Paintings on a 350-scale Semantic Differential

CHARLES V. POWELL, Columbus College, Georgia
(W. L. Bashaw)

As part of a project concerned with the use of the semantic differential (Osgood, Suci, and Tannenbaum, 1957) as a measuring instrument in art education research, each of 428 college students rated one of 43 paintings on a 350-scale semantic differential. Changes in response patterns during the course of taking the differential were studied as a function of the proportion of scales already completed. The order of scales was randomized. Dependent variables were: (a) the number of extreme (1 and 7) responses, (b) the number of moderate (2 and 6) responses, (c) the number of slight (3 and 5) responses, and (d) the number of neutral (4) responses. Results showed that moderate and neutral responses remained constant throughout the ratings, while extreme responses showed a steady decrease and slight responses showed a steady rise.

Results are of theoretical interest in that they indicate the effects of a technique variable (i.e., length of the semantic differential), which may have been confounded with effects of stimulus variables in previous work with this measurement technique.

Preliminary results of factor analysis of these scales are also reported and briefly discussed, along with a short discussion of some potential uses of semantic differential measurement in research in art education.

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Using the Affective Domain in Research

MICHAEL J. GRADY, JR., and HOWARD B. HITCHENS, JR.,
United States Air Force Academy

Eleven affective objectives were constructed for a General Psychology course. A one hundred-item test, covering these objectives, was developed according to the protocols in Bloom's *Taxonomy of Educational Objectives: Affective Domain,* and given to the Fall 1966 class as a pretest. At three equally spaced intervals during the semester, the questions from the original questionnaire relevant to that portion of the course just completed were administered to the class. Analysis of covariance was performed to measure the immediate affective impact of the course with pretest scores as the covariate. At the conclusion of the semester, the one hundred-item questionnaire was administered as a posttest. Two related analyses were performed to measure the significant shift in attitudes. An analysis of covariance was performed, with pretest scores as the covariate, to determine global evidence that shifts in attitudes occurred as a result of being exposed to the general psychology course. 3 x 3 contingency tables were constructed on a question-by-question basis to determine the degree and direction of attitudinal shift. An assessment was performed concerning the degree to which the affective course objectives were attained, and both the affective objectives and teaching strategies were revised in light of these findings.

11:00 A.M. to 12:15 P.M. **SESSION 24** **DIVISION C**

INFLUENCES ON TEACHER JUDGMENTS OF STUDENTS AND STUDENT JUDGMENTS OF TEACHERS

CHAIRMAN:

Carolyn M. Neal, Roosevelt University

PAPERS:

Some Relationships between Course Grades and Student Judgments of College Teachers

HERBERT GARBER, University of Connecticut

Student ratings of eight teacher characteristics were gathered after final grade reports were mailed, and were used as variables in multiple regression analysis.

Moderate-sized, highly significant coefficients (.43, $p < .001$; .31, $p < .001$) were found when the criterion was a "difference score." The criterion was the difference between the student's actual grade in course and the quality-point-ratio (Q P R) of the student rater. It was hypothesized that students would expect a grade close to their usual grades and that one which differed might affect student perceptions of the teacher. The hypothesis was strongly supported.

Examination of the correlations among the teacher traits and the criterion revealed the presence of two suppressor variables: "knowledge of subject" and "appearance and mannerisms." The belief generated by previous studies, that student perceptions of their college teachers is unaffected by course grades, is now open to question.

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Sex Differences in Instructor-Examination Grades of College Students (or, It Helps to Wear a Skirt)

EDWARD CALDWELL, University of South Florida, and
RODNEY HARTNETT, Educational Testing Service

At a university where grades in required, lower-level, general education courses are assigned on the basis of a combination of scores on a common final exam (i.e., all Ss take same test regardless of course section) and instructor evaluation, male and female performance was analyzed. Instructor grades and examination grades were obtained for male and female Ss in fourteen different courses ranging in content from English to Mathematics and Physical Science, in number of sections from five to twelve, and in number of Ss from 94 to 368. Because the common examination (objective) was constructed by a person skilled in test construction, according to a course-wide syllabus, and with the approval of the head of the department, it provided an excellent control for course achievement against which the individual instructor ratings could be compared.

The findings reveal a marked instructor-grade advantage for females. Though the over-all male performance on the common examination is slightly superior, females receive higher instructor grades in a fashion not explained by chance. The findings are further examined by subject-matter areas and sex of instructor. Possible reasons for the differences are discussed.

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Perception of Teacher Effectiveness as a Function of the Student's Need for Social Approval

WILLIAM F. WHITE, The University of Georgia, and
JAMES A. WASH, JR.,* Medical College of Georgia

There appears to be increasing evidence that a subject's need for social approval within an evaluation situation affects his test responses and even his perceptual field. In 8 classes of Educational Psychology taught by male instructors, 82 male and 104 female students were administered the *Marlowe-Crowne Social Desirability Scale* and the *Pupil Observation Survey (POS)*. Factor analysis of the data obtained from the *POS* items yielded 10 factors for students low in the need for social approval and 12 factors for their colleagues noted high in social desirability needs. Marked differences in the factor structure supported the belief that student perceptions of the motivational cues of male college teachers are dependent upon the intensity of the students' need for social approval. Students who demonstrated a high need for social approval placed the warm, sociable, understanding characteristics of the male teacher as primary among the sources of their motivational perceptions; primary among the source traits of the effective teacher for students rated low in social desirability needs were friendly, cheerful, stimulating characteristics of behavior.

Examining the 120 correlations between the factors of both groups, 13 were found to be significant at the .05 level, and 37 at the .01 level of confidence. Although there was much communality between the two factor structures on those particular factors, sufficient support was given for the importance of social desirability as a contributor to the variance of those perceptions.

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Scholastic Aptitude, Achievement, Creativity and Teacher Motivational Cues

JOHN C. STEVENS, HARRY E. ANDERSON, JR., and WILLIAM F. WHITE,
University of Georgia

A random sample of 197 students, approximately 25 boys and 25 girls each from grades 9 to 12, was selected from English classes. The total sample was administered a battery of tests which included the Pupil Observation Survey (POS) and 14 scales developed from three of Guilford's creativity tests (viz., Plot Titles, Apparatus Test, and Utilities Test).

From correlations of the POS and creativity rotated factor scores, there were indications that students who scored relatively higher on the Apparatus and Utility scales perceived their teachers as having more "democratic leadership" and being "knowledgeable." Students who demonstrated creative ability in fluency and originality of "Plot Titles" were influenced both by the unfriendly, uncheerful cues of their teachers as well as the teacher's opposition to student-centered instruction.

High classroom achievers in English also perceived their teachers as having "democratic leadership" and "knowledgeable qualities" but insisting on the content-oriented classroom. "Student centered instruction" and "knowledgeableness" were perceived as the more important teacher cues by those students with higher CAT scores. Of all 10 characteristics of teacher behavior, only the "unfriendly, uncheerful" behavior was significantly related to higher scores on the CTMM.

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Attitudes Toward Education and Perception of Desirable Teacher Behaviors: A "Q" Study

Marvin Sontag, Teachers College, Columbia University

Do two major factors that underline attitudes toward education, "progressivism" and "traditionalism," emerge in the perception of desirable teacher behaviors? Eighty teachers (32 progressives, 32 traditionalists, and 16 whose attitudes were indeterminate) were exposed to a teacher behavior *Q* sort. Half the subjects sorted the behaviors according to their importance for elementary school teachers and half for high school teachers. The responses of the subjects under each of the two conditions were intercorrelated, and the resulting two correlation matrices (elementary and high school) were factor analyzed with the principal axes method and varimax orthogonal rotations. Four persons factors emerged from each analysis. The elementary school factors were: Concern for Students, Structure and Subject Matter, Stimulating Teaching, and Self-Control in Teaching. The high school factors were: Concern for Students, Structure and Subject Matter, General Subject Matter Presentation, and Norms and Rules. The "Concern for Students" factors from the two analyses were substantially correlated ($r = .77$). The "Structure and Subject Matter" factors were also substantially correlated ($r \pm .70$). The former factors reflected progressive tenets of teaching while the latter reflected traditional tenets of teaching.

11:00 to 11:50 A.M. SESSION 26 DIVISION C

STUDIES OF READING COMPREHENSION

CHAIRMAN:

George T. Gabriel, Baltimore County Schools, Maryland

PAPERS:

Phrase Reading Training with Third Grade Students

Bruce R. Amble, Southern Illinois University

Recent experimental research with phrase reading films established the procedure as a method of helping intermediate grade school children improve their reading skills. A new phrase reading films series for primary grade students has been developed to determine whether a similar program of phrase reading instruction will help younger students improve their reading skills. Two experimental studies with third grade students were carried out, with pre-post reading test results reported at AERA. Experiment I included 12 classrooms randomly assigned to one of three conditions. Group A received a phrase program of approximately 11,000 phrases over a seven week period. Group B received a program of about 5,500 phrases during the same training period. Group C remained in the regular language arts reading program. Experiment II included 16 classrooms randomly assigned to one of four conditions. The three experimental groups each received a phrase reading program of 7,800 phrases. However, the first group viewed the ten films in the series three times each. The second group viewed five of the films six times each. The third training group viewed two of the films 15 times each. The control group remained in the regular language arts-reading program. Questions relating to the type and amount of training were answered with reference to initial reading level, IQ and gain scores.

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The Relationship of Attitudes to Reading Comprehension in the Intermediate Grades

Milton D. Jacobson, University of Virginia, and
Joseph C. Johnson II, Laboratory Center for Reading,
Newport News, Virginia

This study examined the reader in grades four to six with regard to the manner in which his attitudes toward certain thematic content is related to his comprehension of reading selections. Three themes were utilized. The first, the anthropomorphic, was found in success stories of animals who possessed the virtuous human characteristics of honesty, humility, etc. The second dealt with the victorious underdog story character. The third was concerned with the character who possesses definite culturally alien attributes that facilitated group endeavor and harmony.

Procedures included: (1) The most common reading themes inherent in children's stories at the intermediate grade level were determined by surveying the literature. (2) A Thurstone-type attitude inventory was constructed for each theme. (3) A sample of 400 students, representative of national norms in intelligence and reading ability, was selected from two schools in Virginia. (4) Experimenter devised literal and interpretative comprehension tests were administered. (5) Computerized covariance techniques were used to control variables found to affect the relationships between attitudes and recalled comprehension responses.

The variables significantly affecting this relationship were sex, chronological age, school, grade level, socioeconomic status, and intelligence level. Racial characteristics did not affect this relationship. It was concluded that significant differences in literal comprehension of reading materials of a culturally alien theme, and significant differences in recalled interpretative comprehension, could be attributed to attitudes.

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The Effect of Material Written with Certain Oral Language Patterns on Reading Comprehension

Susan M. Tatham, University of Wisconsin

This study investigated the relationship between children's oral language patterns and comprehension of material written with these patterns. The following questions were asked: (1) Is comprehension of a passage that utilizes frequent language patterns significantly greater than of one utilizing infrequent patterns? (2) Are there significant sex differences in reading compresion scores from passages that utilize high or low frequency patterns? (3) Are there significant differences in reading comprehension scores from passages that utilize high or low frequency language patterns among children of differing intelligence levels?

Seventy fourth-graders were assigned to two treatment groups stratified on the basis of sex and IQ. Group IA read a 254-word passage that used language patterns identified by prior research as occurring frequently in fourth-graders' oral language. Group IB read the same 254-word passage written with language patterns identified by prior research as occurring infrequently in fourth-graders' oral language. Vocabulary level and sentence length were controlled by the Dale-Chall readability formula. Comprehension was determined by the cloze procedure.

Preliminary analyses of the results indicated that comprehension scores on the passage that utilized high frequency language patterns were significantly greater than on the passage that utilized low frequency language patterns.

Children's Perception of Difficulty in Reading Materials

JAMES T. FLEMING, University of California, Los Angeles

An experiment was designed to assess the following relationships: the consistency with which fifth-grade children are able to choose the easiest and the most difficult reading materials; their level of reading comprehension and their perception of easy (and difficult) reading materials; their comprehension and the level of reading materials they select as best for themselves to read.

Experimental materials consisted of 32 short, graded reading selections, approximately equal in length, representing eight interest categories, each of which contained four selections of similar topical content. The use of readability formulas assured that each subset of four contained a 3rd, 5th, 7th, and 9th-grade selection. A comprehension test was constructed from eight of the 32 selections; considerable data from standardized tests were also used.

Results showed little consistency in S's choices of easy and difficult materials; a significant negative correlation between easy-choice task scores and comprehension scores ($p = -.26$; $P < .05$); no systematic relationship between hard-choice task scores and comprehension scores ($p = -.004$; $P < .05$). A series of Pearsonian correlation coefficients indicated a significant positive relationship between the level of materials S's chose as best and their comprehension scores. Two 2 x 3 x 3 (Sex, IQ, Level of self-selection) analyses of variance failed to produce any demonstrable significant effects. Only correlational evidence supported the claim of optimal self-selection; the strength of these correlations was not strikingly convincing.

12:00 to 12:50 P.M. **SESSION 30** **DIVISION D, NCMC**

TECHNIQUES OF TEST CONSTRUCTION

CHAIRMAN:

Leroy A. Olson, Michigan State University

PAPERS:

The Empirical Validity of Items Constructed to Measure Complex Intellectual Processes

WILLIAM R. CRAWFORD, San Francisco State College

Recent emphasis on measuring student ability to apply knowledge has resulted in significant changes in testing procedures. Among the most ambitious and successful programs is the one at the University of Illinois College of Medicine. Items in their comprehensive examinations are constructed to measure the intellectual processes defined in *A Taxonomy of Intellectual Processes*. These processes are considered to be hierarchical and are named: (1) Knowledge, (2) Generalization, (3) Problem-Solving of a Familiar Type, (4) Problem-Solving of an Unfamiliar Type, (5) Evaluation, and (6) Synthesis.

The purpose of this study was to determine the factor structure of items from comprehensive examinations written to measure these processes. Seven hundred twenty-three items were administered to 1,524 freshman and sophomore medical students. Item inter-correlation matrices were obtained from item scores in each subject matter and taxonomic category. Rotated factors were extracted from 42 subject matter and 39 taxonomic matrices. These factors could be defined in terms of subject matter but not taxonomic categories. The results are discussed in terms of the accuracy of item classification, uniformity of student responses, the factors defined by subject matter categories, and implications for score interpretation. Suggestions for additional research are presented.

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A Comparison of an Audio-Visual Test with a Written Test

MELVIN H. TENNIS, JR., Dade County Board of Public Instruction,
Miami, Florida

Two achievement tests were constructed to measure understanding of principles of elementary science. One was a written test; the other consisted of recorded narration and sound effects accompanying slides projected upon a screen.

Subjects consisted of the pupils in grades 5, 7, 8, 9 and 10 at the University of Chicago Laboratory School. Each grade had been randomly divided into two sections, designated SS_1W_2 and W_1SS_2, based on the order in which the tests were taken. Sections SS_1W_2 received the audio-visual test first, followed two weeks later by the written test. The other section received the tests in the reverse order with the same two-week period intervening.

Regardless of the order in which the tests were taken, the audio-visual test was significantly easier for all grades. On the audio-visual test the fifth grade section showed a marked reduction in the number of omitted items compared with the written test. Items that were easier on the audio-visual test were those dealing with the phenomenon of sound. The lower the grade, generally the greater the difference between the audio-visual and written tests, indicating the possibility of measuring understanding of more sophisticated concepts and principles at lower grades by means of audio-visual tests.

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A Study of Negatively Stated and Positively Stated Multiple Choice Items

AILEEN W. PARKER and DONALD L. BEGGS, Southern Illinois University

The following hypothesis was tested: Given equally difficult tests of negatively stated multiple choice items and positively stated multiple choice items, students will achieve higher test scores on multiple choice tests composed of positively stated multiple choice items.

Positively stated items were defined as items requiring subjects to select the correct or the most desirable answer. Negatively stated items were defined as items requiring subjects to select the incorrect or the least desirable answer. After the difficulty indices were determined, parallel subtests of 25 items each were constructed with items arranged in order of increasing difficulty. Two test forms of the 50 items were administered during the testing period. Form A presented 25 positively stated items first and Form B presented 25 negatively stated items first. The subjects were 277 students in the educational psychology course at Southern Illinois University.

The results were that the multiple choice tests composed of negatively stated items yielded somewhat better test performance and larger test variability. The distribution of test scores on the negatively stated multiple choice items was more negatively skewed than the distribution of test scores on the positively stated multiple choice items.

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Development and Refinement of a Test of Critical Reading Ability of Elementary School Children

BERNICE D. ELLINGER, The Ohio State University

Critical Reading is defined as an analytical and evaluative type of reading in which the reader makes judgments about the trustworthiness of the information or the quality of the writing. Lack of a measurement instrument of this ability for elementary school children has impeded the progress of research on critical reading. The purpose of the test developed at The Ohio State University was to evaluate the performance of elementary school children (grades 1-6) in specific critical reading skills using both informational and literary materials.

Skills required for critical reading were identified by the authors of the test and were categorized as skills in logic, literature, and general critical reading skills. A design for the test was developed and parallel items were written for each skill to be tested. Tryout forms were given to a national sample and items which discriminated best were then selected for the final forms.

The test of critical reading ability was normed in the spring and fall on a national sample. Fairly high reliability was established. Information on validity is provided by the factor analyses which was conducted on the test data for the spring norms.

12:00 to 12:50 P.M. **SESSION 31** **DIVISION C**

STUDIES OF TEACHING STYLE

CHAIRMAN:

Bryce B. Hudgins, Washington University, St. Louis

PAPERS:

Fourth Grade Creativity and Achievement as Related to Teaching Style

GLEN ROBBINS THOMPSON, Skokie District 68, Illinois, and
NORMAN C. BOWERS, Northwestern University

Fourth grade children were tested in the Fall with the Lorge-Thorndike Intelligence Test and the Minnesota Tests of Creativity. Then teams of observers rated each teacher's teaching of a 30 minute standard curricular unit. These ratings, among other things, showed the degree that each teacher emphasized divergent thought processes, together with her typical reaction to divergent responses on the part of students. At the end of the school year, all subjects again received the Minnesota Test of Creativity, as well as the Stanford Achievement Test.

The data were analyzed so that changes in creativity test scores could be related to teaching style; also, achievement test scores were analyzed to see if the use students made of a particular teaching style was dependent to any significant degree upon their own creativity level. Finally, creativity and intelligence test scores were used as a combination to predict academic achievement with a view to increasing the precision of prediction.

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Pupil Growth Over Two Years in Relation to Differences in Classroom Process

ROBERT S. SOAR, University of Florida

Measures of residual true change in vocabulary, arithmetic, concepts, creativity and anxiety were calculated separately for each of two years for pupils from 45 elementary classrooms. Observations of each classroom each year were carried out using Flanders' Interaction Analysis and a schedule assembled from several other schedules. By two successive factor analyses, 59 measures from these schedules were reduced to nine factors, and factor scores calculated for each teacher separately for each year. Four factors were chosen for analysis, and the teachers were sorted into three levels for each factor for each year. For each factor pupils were then identified in terms of the two-year sequence of levels of classroom process which they had experienced and differences in total change over two years were tested in sixteen 3x3 analyses of variance.

In general, two findings emerged. (1) The effect of factors representing affect seemed to be expressed primarily the second of the two years, whereas for factors which appeared more cognitive in nature, differences the first year produced greater effects. (2) Both sets of factors suggested curvilinear relations between level of classroom process and degree of pupil change.

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A Study of Openness in Classroom Interactions

JAMES B. MACDONALD, The University of Wisconsin–Milwaukee, and
ESTHER ZARET, Marquette University

This study is based on the idea of arranging classroom behavior on a process continuum of openness as contrasted with compensatory and/or defensive behavior. Within this framework teacher and pupil as behaving persons, and the interactions between each, may be conceptualized.

The nine classrooms, from the Campus Elementary School of the University of Wisconsin–Milwaukee comprised the sample of the study. Each classroom was visited during a planning and/or discussion period in the Social Studies program. Tape recordings were collected and transcribed; and analysis of the data was made in terms of the analytical framework developed. The analysis was focused upon critical incidents, defined as teacher decisions, in classroom verbal interactions. Specifically, the behavior examined was the question-answer-response (Q-A-R) flow, and the flow of verbal behavior between critical incidents in terms of the openness process continuum. The two aspects of this examination were: (a) teachers' mediating responses and (b) learners' productive behavior.

Two major questions were asked of the data: (1) Can interaction be classified this way?; (2) If so, what patterns of interaction are suggested? Results indicate that the system of analysis is usable and reliable, and at least three patterns can be identified: (1) role oriented, (2) transaction oriented, and (3) mixed.

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Interrelationships Among Curricular, Social and Affective Dimensions of the Teaching-Learning Act

ROGER V. BENNETT, University of Virginia

This study examined the relative effects of an advanced organizer and an inquiry "curricular organizing strategy" (Appendix A) upon patterns of classroom interaction and pupil affect. The two strategies were used to teach economics in four sixth grade classes. Ninety-six randomly selected children constituted the sample. Lessons were tape-recorded and Flander's system was used to analyze interaction patterns. Two post-session instruments (Appendix B) were used to measure individual daily reactions and summary affective feelings. The research design (Appendix C) permitted 23 comparative analyses, which explored the influence of four variables: (1) strategies, (2) sequences, (3) schools, and (4) teachers. The Darwinian Chi Square Model was used to analyze interaction matrices.

Consistently significant differences were found at the .005 level between the interaction patterns for the two strategies. Descriptive data revealed an almost perfect reversal of teacher influence and teacher/student talk for the two strategies. Less dramatic differences appeared in silence/confusion and content emphasis (Appendix D). Although confounding effects of sequence, school, and teacher variables were not completely eliminated, there was no consistent pattern of influence among any of these variables. No significant differences were found in the affective area (Appendix E).

It was concluded that there were significant differences in interaction patterns, but not in pupil affect, when two different curricular organizing strategies were used in the classrooms.

12:00 to 12:50 P.M. SESSION 32 DIVISION A

SUBORDINATE — SUPERORDINATE RELATIONSHIPS

CHAIRMAN:

Max Abbott, University of Oregon

PAPERS:

The Effects of a Power Figure on Group Effectiveness, Efficiency, and Risk-taking

EDWIN M. BRIDGES and WAYNE J. DOYLE,
Washington University, St. Louis

This study was an experiment conducted in a school setting to determine the effects of a power figure on group effectiveness, efficiency, and risk-taking. In each of ten elementary schools, seven teachers were randomly selected from each school staff; four were randomly assigned to a group by themselves and three were randomly assigned to a group with the principal. Each of the twenty groups was then given the same problem to solve — a logic problem developed by Milton Rokeach in his studies of open and closed mindedness. A total of thirty minutes was allowed for the group to work on the problem. The measure of group effectiveness was the number of beliefs (a total of three possible) overcome during the problem solving session. Efficiency was measured by the amount of time required to overcome the first belief in the logic problem. Risk-taking was measured by computing the difference between the number of solutions generated by the group and the number actually presented to the experimenter. For example, a group may have developed four solutions but submitted only one to the experimenter. The risk-taking score would be 3 derived by subtracting one (the number generated) from 4 (the number submitted for a right-wrong response from the experimenter.

An analysis of the data showed that groups without the power figure (in this case, the principal) were significantly more effective ($p < .05$) and more efficient ($p < .01$) and manifested more risk-taking behavior ($p < .01$) than did groups with the power figure present.

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An Analysis of Interaction Among Principals and Teachers During School Faculty Meeting

DAVID B. CRISPIN, Indiana State University, Terre Haute,
and R. DUANE PETERSON, Wayne State University

Does the behavior of the principal during faculty meetings significantly affect the behaviors of the teachers? To gather data relevant to this question was the purpose of this pilot study. The hypothesis was that the more *indirect* the principal's behavior, the more *supportive* will be the teachers' behaviors.

Paid, reliable observers recorded live principal-teacher behaviors during faculty meetings in thirty elementary schools in the Wabash Valley, Indiana. Symbols were recorded every three seconds or sooner in cases of change of behavior or speaker. Symbols *D* (direct) and *I* (indirect) were used for principals; *S* (supportive) and *N-S* (non-supportive) for teachers. All meetings were after school and lasted 40-50 minutes. All principals discussed the topic, "Utilization of Teacher Time."

An analysis of some 20,000 principal-teacher behaviors derived from 1,350 minutes of interaction indicates that the experimental hypothesis is rejected.

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Supervisory Interaction as Seen by Supervisors and Teachers

ARTHUR BLUMBERG, WILFORD WEBER, and EDMUND AMIDON,
Temple University

This study investigated the perceptions of supervisors and teachers concerning some behavioral, communicative and productivity aspects of supervisory conferences. In order for a supervisor to perform his dual role of maintenance man and change agent in a productive manner, it is important that he establish the kind of interpersonal relationships in which the teacher will see the supervisor as a source of help. A pre-condition for this type of interpersonal relationship is a set of mutually shared perceptions, between teacher and supervisor, concerning the nature of the dynamics of the supervisory interaction.

Using instruments developed by two of the authors, the perceptions of 45 supervisors and 164 teachers were measured. Four types of data were thus obtained from teachers and supervisors concerning their perceptions of supervisory conferences: (1) supervisory behavior, (2) teacher attitudes, (3) the kind and amount of learning, and (4) the degree of productivity. Analysis of these data revealed a number of important significant differences between the perceptions of the supervisors and those of the teachers. Further analysis examined the behavioral perceptions of supervisors who were sorted on the basis of perceived productivity of supervisory interaction. Significant differences were found between those supervisors whose perceptions of productivity tended to agree with teachers' perceptions and those who saw productivity as being considerably higher than did the teachers.

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Accuracy of Interpersonal Perception:
A Function of Superordinate Role

ROBERT B. BRUMBAUGH, University of Oregon

The findings of a field study addressed to the relationship between superior organizational role and accuracy of interpersonal perception are examined with an aim toward the generation of further organizational theory.

Specifically, the study investigates the accuracy of 40 public school supervising teachers and their respective student teachers in estimating each other's FIRO-B protocols after being in close and continuous working contact for a period of 8 weeks. In comparing the accuracy indices of both groups, it was found that supervising teachers were significantly more likely to be accurate in estimating the control needs of their student teachers than was conversely the case.

This finding and other evidences are considered with the speculative conclusion that superiors in the school organizational hierarchy are expected to control their immediate subordinates. It is further postulated that this expectation operates to require superiors to be accurate in their perceptions of the control needs of their immediate subordinates in order that they might remain as effective channels for the flow of organizational authority.

It appears probable that this control orientation structures the interpersonal perceptions of superiors within each immediate superior-subordinate linkage throughout the entire organizational system.

12:00 to 12:50 P.M. **SESSION 33** **DIVISION C**

Joint Session with the International Reading Association

EFFECTS OF INSTRUCTION ON THE DEVELOPMENT OF READING ABILITY

CHAIRMAN:

Carl L. Rosen, University of Georgia

PAPERS:

Transfer Effects of Training Intermediate Grade Pupils to Adjust Reading Speed to Reading Purpose

THOMAS C. BARRETT, THEODORE L. HARRIS, and WAYNE OTTO,
The University of Wisconsin

The results of a previous study showed that fourth grade good readers who received a two-week training program developed substantially their ability to vary their speed when reading short training passages for different purposes. The general purpose of this study was to determine whether the rate variability developed by the training program would transfer to the reading of longer, more school-like materials. Subjects were 72 pupils, equal numbers of boys and girls from grades 4, 5 and 6 who were reading between the 40th and 90th percentiles on standardized reading tests. Purposes for reading were to identify or formulate a main idea, to recall specific facts or to follow a sequence. Half of the subjects were trained with material that had explicitly stated main ideas and half with materials in which the main idea was implicit but not stated. Materials used to test transfer included several paragraphs, and were three times as long as the single paragraph, 66 word selections used in training. The transfer materials were adapted from widely used classroom materials. Analyses of variance showed that subjects retained their ability to vary rate by purpose on an immediate and on a delayed (one month) transfer test.

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Teaching Critical Reading to Elementary School Children

WILLAVENE WOLF, The Ohio State University

The purposes of the study were (1) to determine if critical reading can be taught in grades one through six at the same time normal instruction in the basic skills is maintained, and (2) to determine what pupil characteristics are related to critical reading.

Twenty-four classrooms were utilized in the study, four at each of the first six grade levels. At the beginning of the school year, the groups were administered pre-tests in critical reading and general reading. Twelve of the groups (two at each grade level) were given instruction in critical reading and were designated as the experimental groups; twelve of the classrooms were designated as the control groups and received no instruction in critical reading.

At the end of one year, the students were tested on three groups of variables: (1) critical reading, (2) general reading, and (3) individual variables such as intelligence and personality.

To determine if objective 1 had been achieved, critical reading and general reading scores on the pre- and post-tests were analyzed using analysis of co-variance as the test of significance. Critical reading scores were correlated with individual variables, and combinations of the individual variables, to determine which factors were related to critical reading.

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Observations of the Critical Reading of Children

CHARLOTTE S. HUCK and MARTHA L. KING,
The Ohio State University (Willavene Wolf)

The purposes of the study were (1) to determine if teachers who had received instruction in critical reading teach reading differently than do control teachers who have received no instruction in critical reading; (2) to determine what types of teachers' verbal behavior produced critical or non-critical responses in children; (3) to see how critical responses of children change as a result of instruction; and (4) to see if children in grades 1 through 6 differ in their critical responses to printed materials.

Observations were made on 12 experimental and 12 control groups, four at each of the first six grade levels. Each classroom was observed six times during reading sessions and verbal interactions were recorded on a specially-developed observation scale. The data were analyzed for significance using the chi-square test. It was found that the experimental teachers differed from the control teachers in the type of questions asked and that they did obtain more critical responses from children.

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The Effect of Direct Instruction in Vocabulary Concepts on Reading Achievement

JANET LIEBERMAN, Hunter College, City University of New York

The study evaluated effects of teaching vocabulary concepts through direct experience and conventional instruction on reading achievement and concept achievement in two fifth grades.

Forty-two students with intelligence quotients ranging from 100 to 150 were matched for sex and IQ; individuals of the matched pairs were assigned to groups randomly designated control or experimental. There was no statistically significant difference in IQ, reading achievement or concept achievement.

Reading achievement and concept achievement were evaluated at the beginning and conclusion of the experiment by the Iowa Reading Test, and by a concept scale derived from the student's responses to twenty words. The words were selected from the vocabulary sub-test of the Stanford Binet and the Wechsler Intelligence Scale for Children. The controls were taught through a conventional method; the experimental group was taught vocabulary concepts through direct experience emphasizing auditory, visual and tactile experience.

Results: Control and experimental groups both made progress in reading and in concept achievement. In the experimental group the gain in concept achievement exceeded that of the control group by 33 per cent. These differences were all statistically significant at the .05 level.

1:00 to 1:50 P.M. SESSION 42 DIVISION D

NONPARAMETRIC TECHNIQUES

CHAIRMAN:

Jack C. Merwin, University of Minnesota

PAPERS:

Nonparametric Post Hoc Comparisons for Trend

LEONARD A. MARASCUILO and MARYELLEN McSWEENEY,
University of California, Berkeley

Post hoc procedures using orthogonal polynomials are illustrated for three nonparametric tests that are frequently employed by behavioral scientists in the analysis of empirical data. These examples involve null hypotheses which have been rejected by the Kruskal-Wallis one-way analysis of variance test for rank data, by the Friedman two-way analysis of variance test for rank data, and by the Cochran extension of the McNemar test of change for dichotomous data. Finally, the proposed post hoc procedures are compared to planned comparison methods and in the appendix, a justification for their use is presented.

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C-Sample Normal Scores Tests

MARYELLEN McSWEENEY and DOUGLAS A. PENFIELD,
University of California, Berkeley

The Kruskal-Wallis test is frequently used to decide whether observed differences in c samples reflect true differences in the parent populations or chance variations among samples from the same population. Multiple comparison procedures applicable to the Kruskal-Wallis test have been presented by Dunn and Marascuilo.

This paper presents two nonparametric alternatives to the Kruskal-Wallis test. Because their asymptotic efficiency relative to the F-test equals or exceeds unity and their assumptions are no more restrictive than those for the Kruskal-Wallis test, these tests may prove useful to behavioral scientists. The first technique, employing expected normal order statistics, and its asymptotic equivalent, using the inverse normal distribution, are familiar as transformations of data for which the analysis-of-variance assumptions cannot be satisfied. Their use as competitors to the Kruskal-Wallis test for ranked data is new. The second technique, proposed by Bell and Doksum, uses random normal deviates to obtain a test statistic which is exactly chi-square when the underlying distributions are normal and asymptotically chi-square otherwise. The use of these two test statistics and the applicability of multiple comparison procedures are illustrated with an example taken from research on linguistic structures in paired-associate learning.

The t-test: Parametric or Non-Parametric?

C. MITCHELL DAYTON, University of Maryland

There exist various "stances" among applied statisticians concerning strategies to employ when the model assumptions for parametric tests of inference are violated by data they are called upon to analyze. This paper reviews the relevant empirical literature which reflects on the "robustness" of the t-test and also presents new data on the effects of treating non-interval data by the t-test.

A brief review of studies which have bearing on effects of departures from model assumptions for the t-test is presented. The conclusions from these studies suggest rather definite limits within which the traditional parametric t-test operates with relaive impunity to specific violations. One major assumption, however, has received little direct investigation. This assumption concerns the equality of measurement units underlying the scores upon which analysis is performed.

An original, computer-based study was designed to investigate the effects of treating ordinal data by the t-test. For a broad class of situations involving known degrees of departure from the equal-interval assumption, the t-test proved to be relatively insensitive to these violations. In conclusion, most restrictions on the use of the t-test may be safely relaxed and, for practical purposes, the t-test may be considered "distribution-free".

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The Normal Scores Test for the Two Sample Problem

DOUGLAS A. PENFIELD and MARYELLEN McSWEENEY,
University of California, Berkeley

When attempting to find a significant difference between two populations, educators most frequently choose the t-test as their test statistic. In order to use this test, however, three very stringent assumptions must be satisfied. To avoid these restrictions, the experimenter may choose to use one of a number of nonparametric tests that are available. In the past, the test most commonly chosen was the Wilcoxon test (Mann-Whitney version).

A test yielding even higher asymptotic relative efficiency than the Wilcoxon test is the Normal Scores test. The current versions of this test in the advanced mathematical literature are: (a) Terry-Hoeffding — replace each rank by a corresponding expected normal order statistic. (b) Van der Waerden—replace each rank by a corresponding value from the inverse normal tables. (c) Bell-Doksum — replace each rank by a score drawn from a table of random normal variables.

The purpose of this paper is to describe the above tests in a manner that the layman using such procedures can understand. Meaningful examples will be presented to aid in assimilating the material. Since its efficiency is 99%, the Normal Scores test is the most logical substitute for the t-test when the assumptions underlying the t cannot be satisfied.

1:00 to 1:50 P.M. **SESSION 43** **DIVISION E**

STUDENT INTERESTS AND ATTITUDES

CHAIRMAN:

John A. Connolly, Educational Testing Service

PAPERS:

Non-College Bound Seniors View the Future

DOROTHY M. KNOELL, State University of New York, Albany

Urban high school seniors with no plans for college and with what usually would be regarded as inappropriate preparation were interviewed as part of a statewide study of unmet needs of New York State youth for education beyond high school. A sample of 700 seniors in seven major cities was interviewed. Interviews were also conducted with 200 recent graduates not in college and with parents of 450 young people. The subjects were informed that the Governor had directed the State University to establish new college programs to meet the needs and interests of the many young people who now have no opportunity for college. The interviews involved plans for employment or other activity right after high school and in the future, feelings about "going to college" and the importance of education for self and in general, and perceived need for further education or training under various auspices. Student characteristics data were also obtained.

College was not found to be the unfulfilled goal of urban high school seniors. They purported to value education in high school and college but felt that college was not essential to them in achieving success in life. They tended to be cautious in supporting proposals for extending educational opportunity, while rejecting traditional notions of college. Military service or other opportunity to escape from their surroundings was preferred by many to local college attendance. Findings lead to the conclusion that the mere provision of universal opportunity for college will not be enough if each individual is to achieve his highest potential.

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Personal Value Correlates

O. E. THOMPSON, University of California, Davis

The primary purpose of this longitudinal study was to test the hypothesis that personal or occupational values of students will not change during the high school years. Utilizing the Differential Values Inventory, over 1,000 students in ten high schools were tested initially as freshmen and retested twice during their four years in high school. Over 300 of their teachers also completed the inventory, as well as the Study of Values.

Personal values of students were shown to be reasonably well set upon entrance to high school and changed little during the high school years, especially within schools. Student values were found to be related to their occupational choices, achievement, objectives, kind of community, and whether they were attending a public or private school. Friendship patterns of students were definitely related to their personal values, though only on group characteristics. The popular student had significantly different values than the rejected student.

Teacher personal values were related to their subject specialization and the extent of their participation in religious activities. Teachers differed in value orientation from their students: they were more concerned with Puritan morality, individualism, and moral relativism than were their students. Older teachers were also more traditional than young teachers, who placed more importance on conformity, sociability, and hedonism than older teachers. Students and teachers had definite and intense feelings about what they value in their work. Both wanted their vocation to be a source of pleasure and self-expression without taking responsibility of direct supervision of others.

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Curricular Differences in Academic Interests and Attitudes

ARVO E. JUOLA, Michigan State University

A 650 item inventory was developed to assess curricular interests and attitudes toward education. The ultimate purpose of this instrument was to serve as a guidance tool by which to help students identify curricular areas in which students have compatible interests. The inventory was administered to 2,500 beginning freshmen of each sex in Fall 1965. Three different Chi-square analyses were made by sex for each item. The purposes were to (1) isolate items which differentiate specified curricular groups from freshmen in general, (2) to establish a tentative curricular key for each of 14 broad curricular groups of each sex on the basis of a differential pattern of response, (3) to establish an achievement predictor scale based upon academic attitudes where the scale is designed to differentiate high from low achievers, and (4) to determine whether separate achiever scales are desirable for each of the 14 curricular groups in addition to or in lieu of an overall scale. The entire project will extend to at least two years with additional analyses to be made after a year's follow-up.

This paper reports some of the differences detected between the curricular groups. These include content differences in academic orientations as well as the general tendency for certain groups to be agreeable to almost all activities and others to be generally disagreeable to almost all listed activities and attitude objects. Implications of a completed inventory of this kind for guidance as well as research problems are also discussed.

Social Political Attitudes of the Berkeley Non-Students

William A. Watts and David Whittaker,
University of California, Berkeley (Leonard A. Marascuilo)

As part of a comprehensive study, 151 members of Berkeley's non-student population (variously known as the "Berkeley underground," "fringe" and "hidden community") were interviewed. Since there was no possibility of obtaining a purely random sample, we employed the "snowball technique" where all available accesses into the desired group are initially utilized and other respondents gained by a referral method. For comparative purposes, a random sample of 56 University of California, Berkeley students was drawn and similarly interviewed.

Compared to the students, the non-students were significantly underrepresented in the major political parties and claimed they were less interested in politics both at the state and national levels. However, the non-students were more likely to have participated in political organizations associated with the civil rights movement and those frequently endorsed by "liberals" than their student counterparts. A question related to membership in political organizations concerned with active participation (e.g., marching, picketing) in civil rights causes and protesting the war in Vietnam showed the proportion of non-students greatly exceeding that of students. These data on political activity were further related to a number of personality dimensions.

1:00 to 1:50 P.M. SESSION 46 DIVISION C

TEACHER FEEDBACK AND PUPIL PERFORMANCE

CHAIRMAN:

Mary Meehan, Institute for Community Studies, Kansas City

PAPERS:

Extra-Task Determinants of Classroom Management Effectiveness: An Experimental Investigation

EUGENE H. JABKER, Miami University, Oxford, Ohio

This study was conducted to test experimentally an hypothesized relationship between the teacher's attempts to induce the students' performance of required work and the interaction of: (1) the teacher's rewarding and punishing classroom acts; (2) the non-teacher produced rewarding and punishing classroom events; and (3) the students' dependency on the teacher for guidance and support.

The experiment was individually administered to each of 198 sixth-grade boys who were identified as high or low dependence prone and randomly assigned to one of nine experimental treatments in a 3x3x2 factorial design. In the experimental sessions, each subject was asked to perform four equivalent arithmetic tasks. On the completion of each arithmetic task, one of nine combinations of praise, blame or no comment paired with induced experiences of success, failure, or no information was administered to the subject. Then each subject was required to perform a counting and stacking task. The number of stacks completed by each subject represented the criterion data.

Although the specific hypothesis was not supported, it was concluded that: (1) when rewarding events occur concomitantly with punishing events, they may have a greater motivational effect on performance than when the concomitant events are either homogeneously rewarding or punishing; and (2) the effects of dependency may be limited to tasks which require some but not excessive guidance.

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The Nature and Value of Teacher Verbal Feedback

JOHN A. ZAHORIK, University of Wisconsin—Milwaukee

The specific problems of this investigation were to determine (1) the types of verbal feedback teachers use during the interactive situation and how frequently they use them, (2) the relationship between teacher verbal feedback and several variables associated with the teacher-learning act, and (3) the reinforcement-motivation and cognitive information value of the various types of teacher verbal feedback.

To provide data concerning feedback use and relationships, transcripts of tape recorded classroom lessons were obtained and analyzed. Pupil perceptions of teacher verbal feedback were obtained to provide data relative to feedback value.

The major results of the study were the following: (1) A large variety of types of feedback were displayed, but only a comparatively few types were used with frequency and regularity. (2) There were significant differences in feedback usage in relation to the variables of grade level, lesson purpose, teacher solicitation, and pupil response. (3) The frequently used types of teacher verbal feedback were of some reinforcement-motivation and correctness information value, but several of the infrequently used types provided more reinforcement and information.

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Teacher Verbal Cues and Pupil Performance on a Group Reading Test

GEORGE S. LAMB, Western Washington State College, Bellingham

The purpose of this study was to determine the effects of a teacher's verbal cues encouraging rapid or accurate work upon pupils' responses on a group reading test.

Thirty-six second and third grade classes were randomly assigned to three treatment groups. During the administration of a group reading test the pupils were (1) encouraged to work rapidly or (2) encouraged to work carefully or (3) given no specific encouragement.

Independent variables were treatments, grade level, sex, and reading achievement level. Dependent variables consisted of the number of items correct, the number of items attempted and the ratio of items correct to items attempted. The data were analyzed by analysis of variance. The classroom was used as the experimental unit.

The results were that the treatments did not have a significant effect on the pupils' responses in general. Girls did attempt significantly more items under the speed cues than under accuracy cues. Girls showed superior achievement over boys, but the differences were related more to the accuracy with which they worked than to the speed with which they worked.

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A Combination of Television Presentation and Classroom Teacher Follow-Up to Teach Fifth Grade Science

RAY SKINNER, JR., Ohio University, Athens

This study attempted to measure the effect on achievement and interest in science of fifth grade pupils of various combinations of television presentations and classroom teacher follow-up.

Complete data for 888 pupils in 35 fifth grade classes were used in this study. The treatments consisted of four combinations of television presentation and teacher follow-up. Eight lessons were recorded on video tape, then telecast via a closed-circuit system over a four week period. The first of two television versions consisted of identifying a problem and posing many "unanswered questions" with very little explanation. The second version presented the same content in a direct way with very few questions.

The follow-up involved conducting modified "inquiry session" during which time the pupils inquired by asking their teachers "yes" or "no" questions and conducting "typical discussions." Analyses of covariance, adjusting for differences in I.Q.'s and pre-achievement test scores, were used to test for significance of obtained differences between treatments and between boys and girls.

The two treatment groups who had viewed the "unanswered questions" on television regardless of follow-up performed significantly better on the post-achievement test than the groups viewing the "direct explanation" version. No significant difference between treatments was detected on the pre- and post-interest in science test scores.

2:00 to 2:50 P.M. **SESSION 52** **DIVISION C**

CONCEPT LEARNING: II

CHAIRMAN:

Carolyn Stern, University of California, Los Angeles

PAPERS:

Concept Identification as a Function of Instructions, Concept Type, Labels, Sequence, and Test Item Type

DANIEL O. LYNCH, University of Wisconsin

In the present study, one in a series of studies of human conceptual behavior at Wisconsin, five variables were manipulated: instructions, type of concept, meaningfulness of labels, sequence of concepts, and test item type. The design was 2x2x2x2x4 with repeated measures across two factors having two and four levels respectively. Figural slides presented concept identification tasks to 80 *S*s. The dependent variable was the number of test items correctly classified as exemplars or non-exemplars of concepts. Instructions designed to help *S*s recognize that a concept was to be attained, and also to give the nature of the concept, facilitated concept identification better than instructions only acquainting *S*s with the stimulus material ($p < .001$). Conjunctive concepts were easier than disjunctive ($p < .001$). Effect of meaningfulness of labels was not significant. *S*s performed as well on a sequence of two conjunctive concepts followed by two disjunctive as they did on a sequence of two disjunctive concepts followed by two conjunctive. An interaction of sequence and concept type indicated an Einstellung effect ($p < .025$); prior experience with either concept type tended to lower later performance on the other concept type. The test item effect ($p < .001$) showed that items containing one bit of redundant relevant information were easier to classify than items not containing redundant information.

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Effect of Incentive and Complexity on Performance of Students from Two Social Class Backgrounds on a Concept Identification Task

MARCUS C. S. FANG and J. KENT DAVIS, University of Wisconsin

The relationship between socioeconomic status (SES) and educational achievement of a global nature has been demonstrated in many studies. The relationship between SES and various incentives in connection with concept attainment has not been clarified. The present study, one in a programmatic series designed to clarify conceptual behavior, examines the effects of incentives and complexity on performance of students from two SES levels on a concept identification task.

One hundred eighty junior high school students from two SES levels (high and low) solved concept identification problems at three levels of complexity (1, 2, or 3 bits of relevant information) under three incentive conditions (monetary incentive, symbolic incentive, and no-incentive control). The *S*s were shown a minimum number of stimulus slides which uniquely defined the concept and were asked to categorize the test slides which followed as either belonging or not belonging to the concept. Subjects also responded to a post-test questionnaire designed to evaluate the success of the incentive manipulation as well as to assess the *S*s' attitudes towards working for various kinds of incentives.

Analysis of the correct responses on the categorization task showed that: (a) the performance of high SES *S*s was significantly ($F = 36.30$; $df = 1/162$; $p < .01$) better than that of low SES *S*s; (b) as task complexity increased from 1 to 2 bits of relevant information, performance decreased (no further decrease was observed, however, when complexity was increased from 2 to 3 bits of relevant information), and (c) there was no difference in the number of correct responses made by *S*s in the three incentive groups.

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Memory in Concept Identification as a Function of Concept Complexity, Method of Presentation, and Recall Type

GERALD W. MILLER and J. KENT DAVIS, University of Wisconsin

Current mathematical models of concept learning have assigned memory a limited role in concept identification tasks, specifically in terms of retention of characteristics of the instances used in the problem. The present study, one of a series investigating the role of memory during concept identification, varied concept complexity (1 and 3 values conjunctively defining the concept), method of presentation (simultaneous and successive), and recall type (unrestricted and random) within a 2 x 2 x 2 factorial design. Ten *S*s were randomly assigned to each of the eight treatment groups. Each *S* solved five problems composed of four bi-valued figural dimensions.

Results indicated that both method of presentation and recall type were significant sources of variation ($p < .05$ and .01 respectively); the simultaneous method of presentation and the unrestricted recall condition produced superior retention of instance characteristics and categories. In addition, evidence of primacy and recency effects was indicated by superior recall ($p < .01$) of the first and last instances in a series. Further analyses indicated that *S*s recalled an average of 3.3 bits (82%) of the 4 bits of information contained in each instance. In general, the data indicate that the range of conditions under which the limited memory assumption holds may be severely restricted.

The Relationship Between Learning Concepts and Student Achievement

GLENN E. TAGATZ, Indiana State University,
ELMER A. LEMKE, Illinois State University, and
DEAN L. MEINKE, Indiana State University

This paper concerns the experimental determination of answers to the following questions:

1. What are the effects of the following variables upon information processing in concept attainment tasks: (a) grade level, (b) sex, (c) exemplar or nonexemplar presentation, and response options?

2. What are the effects of the following variables upon concept attainment: (a) grade level, (b) sex, (c) exemplar or nonexemplar presentation?

3. What are the common factors that account for the relationships among the concept attainment tasks and curricular achievement tests?

4. What are the relationships among laboratory variables and the curricular areas as determined by oblique relationships of the common (task and curricular) factors?

Twenty males and 20 females from each of three grade levels (7, 8, 9) were given information-processing tasks related to concept attainment materials: tests from the CAT, SRA achievement series, Stanford achievement, and STEP tests; and concept attainment tasks.

ANOVAs for the information processing tasks revealed significant differences between grade levels and a sex-by-grade interaction. No significant differences were found for sex nor between exemplar-nonexemplar information. ANOVAs for the concept attainment tasks indicated significant differences among grade levels and among problems.

Information processing, concept attainment, and achievement test data were factor analyzed, Alpha solution and Incomplete Image Analysis. Several factors were identified.

2:00 to 2:50 P.M. **SESSION 53** **DIVISION A**

GENERAL ADMINISTRATIVE PROBLEMS

CHAIRMAN:

Donald Erickson, University of Chicago

PAPERS:

Input-Output Relationships in a Sample of California Public Junior Colleges

MARVIN C. ALKIN, University of California, Los Angeles, and
VERNON L. HENDRIX, University of Minnesota

The general purposes of this study were to examine the relationships between the financial and student inputs to California public junior colleges and a set of outcomes of those colleges. For a sample of 15 junior colleges, 22 variables descriptive of community characteristics were used as proxies for student inputs. Three financial measures were used representing gross financial input per ADA and inputs for instructional and noninstructional purposes. Seven criterion variables were used in step-wise multiple regression analyses to (1) estimate the extent to which student input characteristics determined differences in the criterion measures, and (2) the extent to which variation on the criterion variables not explained by differences in student inputs can be explained by differences in financial inputs.

The student input measures seemed to be most effective in the determination of the per cent of students transferring to senior institutions (80% of the variance). Multiple R's ranged from .55 to .89 for the 7 regression models. Significance was at the .01 level in one model and at the .05 level in five others. In the analyses of regression residuals as criteria to be predicted from the financial variables, two of the models were statistically significant at the .05 level.

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Population Age Distributions and Financial Support for Public Education

VERNON L. HENDRIX, University of Minnesota, and
MARVIN C. ALKIN, University of California, Los Angeles

The effects of the percent of population in nine age groups on locally derived current expenditures per pupil in average daily attendance are estimated. Data for 48 states at four points in time (1930, 1940, 1950, 1960) were used. A general linear model was developed to control for changes associated with different time periods, presence of different generations, and selected covariates (percent owner occupied houses and percent population in urban areas).

The most interesting aspect of this study is the model. This type of model should be potentially quite valuable in similar problems involving covariates and measurements at points in time. In general, a greater proportion of the population aged less than 5, 20-24, 35-44, 55 and over, is associated with greater expenditures whereas other age ranges are associated with lesser expenditures when time periods, generations and the two covariates are included in the model.

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The Appropriate Grade Level Placement of Teachers in the Elementary Schools

LLOYD R. O'CONNOR, Eastern Oregon College, La Grande

Children differ, and teachers differ; these were the central assumptions of the study, which investigated how these differences might be assessed so as to specify the most appropriate grade level placement of an elementary school teacher. This study focused on teacher-pupil relationships, as revealed by teachers' responses to the growth and development characteristics of children. A test instrument (APTT) was designed and constructed whose aim was to differentiate among teachers at the primary, intermediate, and upper grade levels.

The procedures adopted for the test construction were those standard in the field. A preliminary form was developed, administered and analyzed. On the basis of the analysis, a revised form was constructed and administered to new experimental groups. Reliability coefficients for the revised form of tests for the primary, intermediate, and upper grade scales were .65, .89, and .76 respectively.

The t-test was applied to the two cross-validation groups. The test differentiated the three criterion groups at the .01 level, and a cross-validation sample of 178 experienced teachers at the .02 level. Two of the three scales also gave significant results in a cross-validating sample of 80 student teachers.

2:00 to 2:50 P.M. **SESSION 54** **DIVISION C**

PROGRAMMED INSTRUCTION: II

CHAIRMAN:

Gerald J. Blumenfeld, Southern Illinois University

PAPERS:

The Effects of Overprompting in Programed Instruction

RICHARD C. ANDERSON, GERALD W. FAUST, MARIANNE RODERICK,
and THOMAS H. ANDERSON
University of Illinois

Each of two versions of the first 25 sets of the Holland and Skinner program, *The Analysis of Behavior,* was given to 54 graduate students. One version was the *standard program* while the second version had been altered to include additional formal prompts such as the initial letter of the required response. Posttest scores of *S*s receiving the *overprompted* programs were significantly lower ($p < .05$) than those of *S*s receiving the standard programs.

The most compelling stimulus in a frame is the question to be answered or the blank which must be completed. A well designed frame forces the student to engage in appropriate precursory behavior, such as reading carefully, before he fills in the blank. But it is suggested that an overabundance of formal prompts allows some students to complete blanks correctly without engaging in appropriate precursory behavior. This does not insure that the responses will come under control of the appropriate discriminative stimuli and it thus can retard associative learning.

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Testing the "Direct Experience" Principle Using Programed Science Materials

JOHN M. GORDON, JR., Oregon State System of Higher Education, Monmouth

A principle fundamental to science education, audio-visual theory, and child development, states that children need direct experience to gain knowledge. Programed instruction, being primarily an abstract exercise, has been criticized for not adhering to this rule. The purpose of this study was to assess the effects of supplementing a basically symbolic science program with more concrete representational forms: either direct experience, silent motion pictures, or still pictures. The criterion test was also developed in the same forms to ascertain any difficulties in the transition from one more or less abstract form to another. Sixteen seventh-grade science classes were randomly assigned to a single program-test form combination. No differences were found in the performance of classes due to either program form, test form, or the transition from one more or less abstract form to another. There were also no differential effects on the items or subtests representing types of higher cognitive functioning. The generality of the "experience" principle is questioned. The principle should probably be replaced by a set of conditional statements that delineate such characteristics as age of the learner, abstraction of the task, and the probability of the representative concrete examples already being in the learner's experience.

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A Report on an Experiment with Computer-Based Economics Games

Richard L. Wing, Center for Educational Services and Research,
Yorktown Heights, N.Y.

In Cooperative Research Projects several economics games have been developed for delivery by computer to sixth-grade pupils. Twenty-five experimental subjects played two of the economics games while a matched group was studying similar economics materials in a classroom. In one game the students seated at the typewriter terminals pretended to be priest-rulers in ancient Sumer. In the second game the role assumed was that of an A.I.D. officer in modern Sierra Leone. Both games simulated economic situations in the two environments.

Results obtained by testing with a specially prepared test, by interview, and by observation were these: (1) Complex economics games were successfully delivered by the computer on a time-shared basis. (2) Interest on the part of students was high. (3) In one game the experimental group did significantly better in the test than the controls. In the other game the controls did slightly better. (4) There was great variation in the time individual students took to play the games. (5) Correlations between gain in understanding of economic principles and the variables of reading ability and intelligence were positive but low. Correlations between gain and time on computer were negative.

A general conclusion is that computer-based games may accommodate individual differences in new and effective ways.

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The Relationship of Learner Characteristics to Media Stimuli and Programing Sequences

Robert T. Filep, System Development Corporation

The purpose of this study was twofold: (1) to examine the relationship of learner characteristics of IQ, achievement, sex, ethnic classification, parent's occupational grouping and audio-visual stimuli presented in linear and branching sequences; and (2) to develop and explore the value of a specially designed test battery comprised principally of divergent and convergent figural items for predicting learner performance. Any identification of particular student characteristics related to specific presentation configurations might suggest a means for more effective instructional communication.

The experimental population consisted of 1,222 eighth grade students drawn from four junior high schools in the Los Angeles City School District. The findings were presented.

3:00 to 3:50 P.M. **SESSION 62** **DIVISION D**

STUDIES OF THE BEHAVIORS AND ABILITIES OF CHILDREN

CHAIRMAN:

John D. Krumboltz, Stanford University

PAPERS:

Interpersonal Communication Behavior of Children in Schools

JAMES H. BEAIRD and JO F. RICHMOND, Oregon State
System of Higher Education, and
ROY E. BUEHLER, Parks Job Corps Center, Pleasanton, California
(Paul A. Twelker)

The study was designed to identify and measure interpersonal communication behaviors of children in school-related settings. Interpersonal communication is defined as a transactional process upon which the origin, growth, adaptation, and survival of the individual, family, and culture depends. Four levels of communication were observed: Biochemical, Motor Movement, Speech, and Technological. Equal numbers of male and female subjects were observed in classroom and nonclassroom settings at ages 5, 7, 9, 11, 13, 15, and 17. A total of 310 subjects comprised the sample.

Contrary to previous assumptions, nonverbal communication behaviors do not become less frequent with age. Evidence reveals that nonverbal behaviors consistently account for more than 75 per cent of all communication behaviors at all ages in and out of classrooms. Further, evidence reveals that communication behaviors of children are adaptive to situations in which they occur and are modified by age. Developmental characteristics of the observed behaviors clearly show influence of the school setting upon these behaviors.

The normative data obtained provide a base against which various types of subpopulations may be compared, e.g., dropout-prone or academically retarded subjects. The observational methodology has been successfully employed in related studies of social reinforcement and clearly permits extension of such research into classroom settings. Implications of this research for various educational activities are indicated.

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Uniformity of Growth in the Basic Skills Throughout the School Year and During the Summer

DONALD L. BEGGS, Southern Illinois University, and
ALBERT N. HIERONYMUS, University of Iowa

In the derivation of grade-equivalent scales supplied with elementary school achievement test batteries, it is generally assumed that (1) growth in all subject areas takes place at a uniform rate throughout the nine months of the school year, and (2) that one-tenth of the yearly growth takes place during the three summer months. This study was designed to investigate the validity of these assumptions.

The Iowa Tests of Basic Skills were administered in January in Grades 3-6 in 78 school systems. Special testing periods during the summer phase were the last fifteen days of May and the first fifteen days of September. In the school year phase of the study, April 15 and October 15 were the special testing periods.

A substantial loss during the summer months was found for the language and arithmetic tests. Nearly half of the obtained distributions for October and April differed significantly from prediction based upon the assumption of uniform growth. In general, the January to April period was the one of most rapid growth, especially in language, work-study, and arithmetic. Otherwise, the patterns of growth were inconsistent from test to test and from grade to grade.

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A Local, Normative Study of Tracing Skill, Handwriting Ability and Handedness with Consideration Given to Physical, Socioeconomic and Classroom Behavior Factors at Kindergarten Level

MARY ROOSE, Washington County Special Education Program, Iowa

Three paper-and-pencil tests, including Goodenough Draw-A-Man, the bilateral tracing tasks from the Illinois Laterality Battery, and a word copying task, were administered to 102 kindergarten children in 1964. Reading readiness scores, health data, socioeconomic facts and teacher ratings of verbal fluency, persistence, social poise, conformity and creativity were also obtained for these pupils. In 1965, achievement test scores were obtained for 68 of these children.

One subsample treatment included comparisons of the 12 left-handed children with 12 right-handed children matched for age, sex, father's occupation and class membership. The only significant variable, among the many considered, was family size. Another subsample treatment compared the top 29 per cent of tracers to the lowest 29 per cent. Significant variables were sex, mean better-hand tracing speed and word-copying error score. The third subsample treatment compared the 16 children who made no serious copying error to the 15 who made two or more serious errors. Significant variables were intelligence, father's occupation, mean better-hand tracing accuracy, verbal fluency, persistence, social poise, reading readiness and reading achievement.

A cut-off tracing score of 14 was the most efficient for classifying these children in agreement with word-copying error scores.

All three of the paper-and-pencil tests proved to be as accurate as the reading readiness test for predicting reading achievement at the end of grade one.

Predicting Grade One Reading Performance: Intelligence vs. Reading Readiness Tests

KENNETH D. HOPKINS, University of Colorado, and
E. GEORGE SITKEI, University of Southern California

The comparative validities for predicting grade one reading success of tests of intelligence and reading readiness is an issue that has received surprisingly little attention, especially in view of the fact that the functions of both types of tests are highly similar for beginning first-grade pupils.

All entering grade one pupils in two elementary schools in a lower-middle class community were administered both the Lee-Clark Reading Readiness Test (1962 revision) and the California Test of Mental Maturity (1957 S-form) during the first three weeks of school. Performances on these tests were correlated with two independent criteria subsequently gathered near the end of the school year: (1) scores on the Lee-Clark Reading Test: First Reader, and (2) end-of-year teacher marks, using a four-category scale. Since a Type I error in this situation is quite innocuous, α was set at .20 in order to reduce the probability of a Type II error, the more serious in this type of study.

In view of the fact that the reading readiness test did at least as well in predicting first-grade reading performance, it was considered to be preferable to the intelligence test when other relevant factors are considered: (1) it required considerably less testing time, (2) it is more easily and meaningfully interpreted, (3) the effects of improper interpretation are much less serious to the pupil, and (4) it is less expensive.

4:00 to 4:50 P.M. SESSION 70 DIVISION C

STUDIES OF TEACHERS OF CULTURALLY DISADVANTAGED CHILDREN AND YOUTH

CHAIRMAN:

Edward R. Fagan, The Pennsylvania State University

PAPERS:

Factors of Sub-Cultural Group Membership and Attitude Toward Aspects of Child Behavior of Head Start Teachers in Texas: Some Relationships

ROBERT P. BOGER, University of Texas

This study was an evaluation of the differences in attitudes toward child behavior of primary teachers in Texas, who were involved in the Head Start Summer program of 1965, on the basis of differences in these teachers' subcultural backgrounds.

A series of experimental forced-choice rating scales designed to measure teachers' attitudes with regard to various child behavior dimensions as well as attitudes toward Project Head Start were administered along with the Minnesota Teacher Attitude Invenory to 1,000 poential Head Start teachers during an orientation workshop. Scores from these instruments formed criterion variables while responses to a biographical data form were used to determine membership in sub-cultural predictor categories on the basis of ethnicity, childhood socioeconomic environment and rural-urban background. The amount of prior teaching experience was also included within the predictor model.

A mutually exclusive groups regression analysis technique, employing the F statistic as a decision rule, was used to determine whether or not non-random differences occurred with regard to criterion variables among ethnic groups. Statistical controls were introduced to hold constant the effect of other predictor variables.

The results of this analysis indicated that Negro, White, and Mexican American teachers differed significantly in their measured attitudes toward child behavior, particularly on an authoritarian-democratic dimension. Differences in optimism for Head Start's effectiveness and in acceptance of the children involved were also noted.

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Identification of Educational Practices of Teachers of Culturally Disadvantaged Youth

JUDITH E. HENDERSON, Michigan State University

Although considerable effort has been expended on studying the disadvantaged child and his socioeconomic environment, little empirical evidence has been gathered about the teacher of the culturally deprived. This paper reports a study that identifies behavioral differences between teaching acts observed in competent elementary teachers in culturally deprived communities and teaching acts observed in competent elementary teachers in other community environments.

Fourteen elementary teachers in inner-city neighborhoods (Detroit, Grand Rapids, Flint) were locally selected as superior teachers of culturally deprived children. Trained observers used the "focused observation" technique, described in the paper, to acquire 250 descriptions of the instructional behavior of the inner-city teachers.

The procedure used observer and self-reported data to describe the important *factors* in a particular classroom moment, what teacher *action* took place during this moment and what *consequences* followed. The observed teachers were then empaneled to derive from the descriptions a model of teaching based upon their common practices. A model was similarly derived from competent teaching of students other than the deprived. These two models were examined for similarity and dissimilarity. Two panels, the teachers originally observed, served to identify those behaviors from the total data pool which are peculiar to one model or the other.

The peculiar elements in each of the sets of behavior cast doubt on the current view that competent teachers of the disadvantaged need only be a "better" version of the competent teachers in other community environments.

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The Effect of Previous Poverty Experience on Success in National Teacher Corps Pre-Service Programs

GEORGE H. LAWRENCE and LEWIS M. K. LONG,
U.S. Office of Education (Robert E. Herriott)

Many administrators engaged in poverty programs assume that people who have had previous poverty experience are more effective in this effort than individuals without such experience.

This paper deals with 188 NTC Interns who were evaluated by NTC faculty for Academic Performance (AC), Teaching and Field Performance (TF P), Relationship with the Disadvantaged (RD), Personal Stability and Strength (PSS), Interpersonal Effectiveness (IE), and Commitment and General Promise (CGP). Scores on each of these variables were then compared, through the use of chi-square, with the previous poverty experience of the NTC Intern.

Significant positive relationships (p .05) were found for variables RD and PSS, but for no others. Interestingly, those whose previous poverty experience was less than one year contributed most of this effect. This sub-group when taken alone scored significantly higher than the no-experience group only on variable PSS. However, it appears likely that with a larger sample a significant relationship for this group of less than one year of poverty experience would show up in regard to variables RD, IE, and CGP. When considered alone, the group with previous poverty experience of longer than one year did not score higher than the no-experience group on any variable. General type of poverty experience appeared to have no effect for this latter sub-group.

These findings have implications for future research and, perhaps, current recruitment practices of poverty programs.

4:00 to 4:50 P.M. **SESSION 71** **DIVISION C**

PROBLEM SOLVING

CHAIRMAN:

G. Bradley Seager, Jr., University of Pittsburgh

PAPERS:

The Induction and Transfer of Search Sets

Bruce W. Tuckman, Rutgers—The State University,
James Henkelman, Gerald P. O'Shaughnessy, and Mildred B. Cole,
University of Maryland

The issue of setting students to search for shortcut solutions to problems, and thereafter have the necessary skills to discover such solutions (together termed a "search set") is a critical one in the educational process. This study was concerned with the effects of appropriate and inappropriate practice experiences on students' search set.

Three short experiments were undertaken, each with 30-50 *S*s per condition. Each involved a sequence of three practice problems (no feedback) followed by a criterion problem. Problems involved a matrix of numbers that had to be summed. Each contained 4 conditions as follows: (1) search experience (shortcut problems) — search criterion problem; (2) non-search experience (no shortcut possible) — non-search criterion; (3) non-search experience — search criterion; (4) search experience — non-search criterion. The experiments differed in terms of the similarity between solution rules on practice and criterion search problems, (i.e., transfer).

When search practice and criterion problems were structurally similar (Expt. 1), *S*s having search experience were more likely to search for and find a shortcut solution than *S*s having non-search experience. However, when search practice and criterion problems differed considerably (Expt. 2, 3), *S*s having search experience searched for a shortcut unsuccessfully, producing longer solution times than *S*s having non-search experience. Thus, the strategy of search transferred but the skills did not. Implications for education are discussed.

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Solution of the Oddity Problem by Preschool Children

James W. Hall, Northwestern University (Norman D. Bowers)

Twenty-eight preschool children (A 3-9 to 5-3 years) were given 96 oddity-problem trials with stimuli varying simultaneously in size, form, and color. Previously half the *S*s were randomly assigned to pretraining which involved learning to discriminate between sets of identical and non-identical objects. This task was similar to certain reading-readiness exercises which other investigators have suggested may be relevant to solution of the oddity problem. Remaining *S*s were given preliminary experiences with *E*s playing children's games.

Although in previous studies few children of this age range displayed oddity learning, in the present case half the *S*s achieved the oddity solution. No reliable difference between pretraining groups occurred. Also found was a strong preference for the middle of the three stimulus positions.

The results indicate that considerably more four-year-olds are capable of achieving the oddity-problem solution than implied by results of most previous studies. Certain differences in method, including discriminability of stimuli, preliminary familiarity with *E*s, and the learning criteria employed, may account for the larger proportion of correct solutions in this study. The similar performance of the two pretraining groups suggests that short-term experience of the sort given does not facilitate oddity learning.

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Intermediate Grade Pupils' Ability to Use Skills in Understanding Scientific Problems

ALEX C. ASHBAUGH, Auburn University

The purpose of this study was to investigate the ability of intermediate grade pupils to use skills in understanding scientific problems. The specific objectives were (1) to select a series of concepts for intermediate grade pupils which are taught in 16mm sound film, (2) to construct an instrument that measures skill in understanding scientific problems for the selected concepts, (3) to instruct by films a group of intermediate grade pupils in the attainment of skills in scientific understanding, (4) to measure the effects of filmed instruction on the ability to use skills in scientific understanding and concept formation, and (5) to arrange the concepts in order of difficulty.

The experimental and control groups included four hundred three pupils in intermediate grades. These pupils were instructed by eight selected films from October to December, 1966. A test to measure concept formation and the ability to use skills in understanding scientific problems was administered to all pupils prior to and immediately following instruction. Concept formation was measured by Part I of the test while skills in understanding scientific problems was measured by Part II.

Analysis of Variance (Least Means Square) was computed to make a comparison of achievement scores by those pupils who received planned instruction in scientific problem solving with pupils who had not received planned instruction, and to determine whether having had such instruction resulted in significantly higher achievement as measured by the scientific problem skills test.

Information and Subject-Matter Structure

BRUCE MUSSELL and PAUL JOHNSON, The University of Minnesota

In an attempt to determine the effects of the structural relations among the constructs of a subject matter on performances which involve these constructs, students of physics were given problems based upon the defining equations of Newtonian Mechanics. These problem statements were varied in terms of the relative position of the constructs within each statement as well as in terms of the presence and absence of solution irrelevant constructs. The information content of each problem statement was measured by the average probability with which students replaced both missing letters and missing constructs in the statements. The information content of the problem statements was related to the structure of the constructs in the subject matter and also to the probability of problem solution. Implications of the use of information theory as a tool for assessing certain aspects of subject-matter structure are discussed.

4:00 to 4:50 P.M. **SESSION 72** **DIVISION D**

STATISTICAL METHOD AND THEORY

CHAIRMAN:

Jack V. Edling, Oregon State System of Higher Education

PAPERS:

Some Hypotheses about the Null

M. Clemens Johnson, The University of Michigan

The null or statistical hypothesis is widely used in educational research, playing a central role in conclusions which are reached. More frequently than desirable the hypothesis appears to be misunderstood or used without careful consideration of its values and limitations. A result is that a particular research report may be misleading in its conclusions.

This paper discusses the theoretical role of the null hypothesis in educational investigations, and attempts to clarify concepts central to the use of this hypothesis. Such a discussion would seem to be of current value, particularly with the expanding number of research workers in education.

The relationship of the null hypothesis to the theoretical hypothesis of an investigation is not easily explained, so this problem is considered in more detail. Critical thinking is required when one makes the important leap from the null to the theoretical hypothesis about which the investigator formulates general conclusions.

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The Unconditional Power Function of McNemar's Test for Change

Donald L. Meyer, Syracuse University

The hypothesis that two correlated proportions are equal is equivalent to the hypothesis that the proportion of change in one direction is equal to the proportion of change in the opposite direction. This latter hypothesis is tested by McNemar's test which is conditional on the total number of units changing response.

Before the experiment or survey is performed one may be interested in knowing the sample size required to reject the hypothesis if it is false. Since this judgment must be made before the number of units changing response is observed, the power function calculated unconditionally must be examined. This power function depends on the nuisance parameter, proportion of change, which must be specified within certain limits in order to estimate the sample size required.

Tables and charts of the power function are presented. A Bayesian solution is also discussed.

Statistical Methods Dealing with Markov Chains

SILAS HALPERIN, Syracuse University

The research reported in this paper deals with methods of applying Markov chains to the study of human development. Statistical tests of two of the assumptions of the model are discussed, along with estimates of the Markov parameters.

The first assumption states that the probability that an individual will enter a given category at the next observation depends only on his present category. The second assumption states that the transition probabilities are independent of time. Both assumptions can be tested using either a contingency statistic or a transformed likelihood ratio statistic, both of which are distributed asymptotically as chi-square. Estimates of parameters are obtained by the method of maximum likelihood.

For each assumption, the empirical distributions of the two statistics were generated for various sample sizes using Monte Carlo methods. The empirically derived upper alpha values for the two state model were close to expected with samples as small as fifty, indicating that the distributions limit to chi-square quite rapidly. As sample size was varied, it was also observed that the contingency statistic converged more rapidly to the theoretical distribution than did the likelihood statistic. For Type I considerations, this implies that the contingency statistic is to be preferred over the likelihood statistic.

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Iteration Procedures for Estimating Communalities with Canonical Factor Analysis

LOUIS A. PINGEL and CHESTER W. HARRIS,
The University of Wisconsin

Two distinct iteration procedures for estimating communalities with canonical factor analysis are identified, one being the procedure as developed by Thurstone and the other being that as developed by Rao. The basic difference in rationale underlying these procedures as well as the conditions under which they give identical results are discussed. In addition, communality estimates resulting from these two procedures are compared, and modifications of the procedures are considered.

An example in which the Thurstone-type procedure, the Rao-type procedure, and the modifications of each are compared is presented. It is shown that the final communality estimates are, in each case, essentially the same but that the number of iterations required for convergence to these values differs according to the procedure used.

4:00 to 4:50 P.M. **SESSION 73** **DIVISION D**

RESEARCH ON TEACHING BEHAVIOR

CHAIRMAN:

Clayton L. Stunkard, University of Maryland

PAPERS:

Validation of a Teaching Competency Test for Social Science Instructors

EVA L. BAKER and W. JAMES POPHAM,
University of California, Los Angeles

At last year's AERA meeting the rationale was presented for a procedure to assess teaching competence based on an instructor's ability to promote learner attainment of a set of specifically stated objectives. U.S.O.E. supported work had just commenced on a test in the social sciences dealing with the topic of Social Science Research Methods. During the twelve months since the last meeting the initial version of the performance test has been completed.

This paper reports results of early field trials which dealt primarily with the quality of the pre- and post-tests, as well as measures of variables potentially useful in equalizing class differences in ability, interest, etc. More importantly, results of a field test (scheduled for January, 1967) are reported, which was designed to test the validity of the social science performance test. The performance of experienced (at least one quarter) student teachers who have (1) satisfactorily completed professional coursework and (2) achieved "excellent" ratings from their supervising teachers is contrasted with the performance of individuals who have comparable academic backgrounds but lack the teaching experience and professional coursework. Both groups taught small numbers of high school students whose pre- to post-test performance gains will serve as an index of the teacher's competence. The prediction was that the experienced teachers would significantly out-perform their inexperienced counterparts.

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Descriptive Profiles of Beliefs and Practices of Teachers

TOM R. VICKERY, JR., and BOB BURTON BROWN, University of Florida

The data collected by the *Personal Beliefs Inventory,* the *Teacher Practices Inventory* and the *Personal Opinion Questionnaire* in the first two years of the Teacher Competence Research Project has provided a fertile description of the personal beliefs, seen from the perspective of John Dewey's philosophy and the subjects' openness to new experiences, of seven groups of people involved in education: student teachers, graduate interns (M.A.T. programs), cooperating teachers, education professors, academic professors, clinical professors, and clinical supervisors. The beliefs profiles of these people will be shown, and the correlations between the responses of the various groups on particularly relevant items will be discussed. For example, cooperating teachers were found to be significantly less experimental in belief than any members of the university community.

In addition to summarizing this data, the importance of position, sex, educational level, recency of exposure to the university community, and other factors is discussed in relation to these descriptions. Fecund hypotheses for further research and relevant implications for educational practice are advanced.

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The Reliability of Observations of Teachers' Classroom Behavior

Bob Burton Brown, William Mendenhall, and Robert Beaver,
University of Florida

This paper describes the development and research use of the *Teacher Practices Observation Record,* an instrument for measuring systematic observations of teachers' classroom behavior. Primary focus is put on the report of reliability data obtained from a study of observations of five filmed teaching episodes by 72 observer-judges in California, Illinois, New York, and Wisconsin.

There is a brief discussion of the theoretical framework of the TPOR, which attempts to measure the agreement-disagreement of teachers' classroom behavior with educational practices advocated by John Dewey's philosophy of experimentalism. Last year at AERA was reported the development of the *Personal Beliefs Inventory* and the *Teacher Practices Inventory* which measure teacher beliefs along the same dimension.

In this paper is reported the reliability data on the TPOR, in the context of the general problem of designing reliability studies for dealing with data obtained from similar schemes for the systematic observation of classroom behavior. For example, the general design for reliability estimation given by Medley and Mitzell in Gage's *Handbook of Research on Teaching* is discussed critically, and two alternative designs are offered and illustrated with the data obtained with the TPOR.

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Development of Instructional Competency Tests for Vocational Education Teachers: A Status Report

W. James Popham and Eva L. Baker,
University of California, Los Angeles

At the 1965 AERA meeting a paper was presented which described the rationale and early development progress in the preparation of a heretofore untried procedure for assessing teacher competence, namely, through the use of measures based on a teacher's actual instructional performance. Briefly, the performance tests require the instructor to attempt to achieve a series of explicitly stated objectives for a two week period of instruction. Pre- and post-tests based on these behaviorally stated objectives are administered by project staff members to the teacher's pupils. Thus, an index of teaching effectiveness is provided by the instructor's ability to promote learning attainment of pre-specified instructional goals.

Two of these tests are in the field of vocational education (auto mechanics and electronics). The paper will describe the results of field trials with several forms of these tests. Certain field tests were focused on the identification of satisfactory measures which could be employed to equalize, through statistical or other methods, the quality of different teachers' classes. Field trials will also be described in which the teaching performance of experienced teachers is contrasted with that of non-credentialed craftsmen from industry. This latter test, i.e., the contract of teachers versus non-teachers, is the key hypothesis underlying the U.S.O.E. supported project.

8:00 to 8:50 A.M. **SESSION 83** **DIVISION C**

ATTITUDES AND OPINION CHANGE

CHAIRMAN:

Harry Osser, Johns Hopkins University

PAPERS:

Attitudes Toward Education and General Social Attitudes: A "Q" Study

INEZ L. SMITH, New York University

What is the relation between attitudes toward education and general social attitudes? Do individuals who hold particular social attitudes also hold related educational attitudes? Thirty-six subjects, half of whom were chosen for their known educational attitudes and half for their social attitudes, sorted two educational-attitude *Q* sorts and one general-social-attitude *Q* sort. The *Q* sort data were intercorrelated, factor analyzed, and rotated to the Varimax criterion. Two factors accounted for the major proportions of the common factor variances in both education *Q* sorts. Factor array analyses were used to identify these factors as Progressivism and Traditionalism. Two factors also accounted for the major proportion of the common factor variance of the social attitude *Q* sort data. Factor array analysis of these data indicated that one factor was a Liberalism factor and the other a Conservatism fctor. The coefficients of congruence calculated between Progressivism and Liberalism, on the one hand, and between Traditionalism and Conservatism, on the other hand, yielded indices of factorial similarity between .86 and .92. The results seem to indicate that two major factors underlie each of the educational and the social attitude domains. In addition, educational attitudes seem to be subsets of general social attitudes.

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Student Attitude Learning as a Function of Parental Acceptance and Sex of Teacher

WILLIAM J. GNAGEY, Illinois State University

Four representative educational psychology classes (N = 177) were selected from the Spring semester offering at a large midwestern teacher's college. Two classes were taught by a female instructor and two by a male instructor of comparable age and MTAI score. The same units were covered in all four classes.

At the beginning of the semester, all classes were administered measures of mother and father acceptance (Revised Ausubel Parent Attitude Rating Scale) and attitudes toward teaching (Minnesota Teacher Attitude Inventory). At the close of the semester, the MTAI was readministered.

The following results appeared: (1) In the male instructor's classes, girls who scored below the median on father acceptance made significant MTAI gains while girls who scored above that median did not. (2) In the male instructor's classes, significant MTAI gains were made by boys who scored above the median on father acceptance as well as those who scored below that median. (3) In the female instructor's classes, significant MTAI gains were made by girls who scored above the median on mother acceptance as well as girls who scored below that median. (4) In the female instructor's classes, boys who scored below the median on mother acceptance made significant MTAI gains while boys scoring above that median did not.

These results were interpreted as a demonstration of the influence on attitude learning of non-acceptance by the parent of the opposite sex and the displacement of student feelings about their parent on to their teachers.

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Personality and Communication-Mediated Opinion Change: The Influence of Control

Edward Levonian, University of California, Los Angeles

The typical study of personality and communication-mediated opinion change has failed to utilize data from a control group not exposed to the communication. The current study investigated the influence of control data on the interpretation of results in this type of study. Responses were obtained from 540 undergraduate students to four arbitrarily-selected personality scales and an opinion questionnaire administered twice, with 324 of these students exposed to an instructional film before the second administration. The relations between personality and opinion change for the experimental group differed substantially from the control group but not from experimental groups of eight similar studies. These results suggest the equivocality of previous interpretations and the desirability of control in this area.

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Meaningful Progress with Educational and Emotional Problems in the Special Education Program

Elizabeth E. Hoyser, Oregon College of Education, Monmouth

The special education teacher in the public schools frequently has to work with students who have both reading and adjustment problems. Thus a pilot study was designed to determine the relative effectiveness of two organizational patterns for dealing with such problems. It investigated the effect of combining play therapy with remedial reading instruction on progress in reading and classroom adjustment for a small group of emotionally disturbed third and fourth grade disabled readers.

Students referred for remedial reading were randomly assigned to one of two groups: play therapy only or play therapy and remedial reading. The special education teacher met with both groups five days each week for a period of approximately six months. Standardized reading tests administered at the beginning and end of the six months period indicated an average gain in reading of eight months for students in the play-therapy-only group while students participating in the combination of play therapy and remedial reading program showed an average gain of thirteen months. Homeroom teachers reported positive behavioral changes for all students in both types of programs.

The results of this pilot study then suggests that meaningful progress in dealing with both educational and emotional problems can be made through the utilization of existing facilities and personnel in a typical suburban setting.

8:00 to 8:50 A.M. SESSION 85 DIVISION C

PROGRAMMED INSTRUCTION: III

CHAIRMAN:

Thomas S. Nagel, Michigan State University

PAPERS:

A Failure to Teach a Sight Vocabulary by Vanishing Literal Prompts

Orpha K. Duell and Richard C. Anderson, University of Illinois

Taber and Glaser (1962) designed a program to teach a sight vocabulary consisting of eight color names to kindergartners and first graders. The program was designed to shift the stimulus control of a response (the naming of a color) from one stimulus (the actual color) to a second stimulus (the written color name) by pairing the written word with a prompt consisting of colored lines. These "literal prompts" were vanished by gradually shortening them and were finally removed. Taber and Glaser's procedure was duplicated in the present study; however, the data collected to date fail to show any transfer of control from one stimulus to another. In fact, every child (N = 8) has said "black" to every color name as soon as the prompts have been completely vanished. Taber and Glaser have suggested that the literal prompt method can easily be applied "wherever it is desirable to attach or transfer an existing set of discriminations to a new set of stimuli". The present results suggest that the gradual removal of literal prompts does not by itself automatically guarantee the desired shift in stimulus control.

The vanishing procedure seems to have failed in this instance because the child could respond correctly without paying attention to the letter cues.

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Manipulating the Effectiveness of a Self-Instructional Program

James C. Moore, University of New Mexico

Three principles of programmed instruction identified as the gap, irrelevancies, and mastery principles were systematically varied. Eight versions of the Test-Taking Strategy Program (TTSP) were prepared. Each version represented an experimental treatment under a level of the gap, irrelevancies, or mastery main effects in a 2 x 2 x 2 analysis of variance design. Criterion tests, one for each of four kinds of test conditions regarding time and penalty for guessing characteristics, were administered to each subject. The criterion of interest was the number of guessing responses a subject made under each of the four test conditions. Four 2 x 2 x 2 analyses of variance were completed. Major findings indicated that when content similar to the criterion tasks was removed from the instructional materials to create a gap, statistically significant decrements in performance occurred in three of the four analyses. In Analysis I mastery interacted with the irrelevancies effect, and the findings suggested that when irrelevant material was introduced into the instructional content and was required to be mastered, a decrement in performance resulted. However, material containing irrelevant instruction that was not required to be mastered did not result in performance decrements. In Analysis II mastery interacted with the gap effect. This finding suuggested that requiring students to master materials containing gaps may be detrimental to mastery of the overall instructional objective.

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Specific Review in Learning a Hierarchical Task

M. DAVID MERRILL, Brigham Young University

Merrill (1965) found in a programed presentation of an imaginary science when *S*s were given a correction/review procedure that, instead of facilitating their performance, these *S*s took more time on the presentation frames on each successive lesson and took more time to complete the criterion test and the retention test than *S*s who did not receive this correction/review procedure. A second study revealed that of the three factors which comprised the correction/review procedure (i.e., general review, specific review, and correction) only specific review (SR) was effective in improving performance. The purpose of the present study was to replicate and extend the first study by substituting specific review for correction/review. It was hypothesized that *S*s who receive SR will make fewer errors and take less time (1) on each successive lesson, (2) on the criterion test, (3) on a three-week retention test, and (4) on a three-week transfer test than *S*s who do not receive specific review (No R). Results indicate that on P-frames there was no difference in errors between SR and No R, but there was a significant difference in time per frame. The interaction was also significant indicating that No R took progressively more time per frame than SR. There was no significant difference in errors between SR and No R on the criterion, retention, or transfer tests; however No R took significantly more time per question than SR. The specific review procedure while not decreasing the number of errors *S* makes does increase his efficiency and allows him to complete the entire task in less time, in spite of the fact that he sees more material than does No R.

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Teacher-Pupil Interaction Cues in Learning: An Experimental Analysis

B. Y. KOOI, System Development Corporation,
R. L. BAKER, Arizona State University, and
R. E. SCHUTZ, Southwest Regional Laboratory for Educational Research

This study investigated cue-producing aspects of experimenter-subject interactions which occur during administration of a programmed learning sequence to pre-school children. Three types of interactions were independent variables: social reinforcement, verbal cues to correct errors, and visual cues provided by experimenter presence. Their effect was investigated upon a frame-by-frame record of errors which results from a 136 frame matching program designed to shape letter discrimination. Numbers of errors, differences in slopes of graphed cumulative errors, breakdowns in performance, and error patterns leading to breakdowns were dependent variables.

Response records were first compared when all interactions were available and when all were eliminated by mechanical presentation. Then cueing effects of individual interactions were explored by reintroducing the independent variables singly into the mechanical process and observing their effects upon individual response records.

Examination of individual records shows that control of responding was lost with subtraction of all experimenter-subject interactions. However, differences in response patterns obtained under each condition indicate that single interaction variables did not have simple additive effects. Cues manifested auditorily facilitated correct responding more than visual cues; however, this facilitation disappeared when auditory content was not related to specific aspects of program stimuli.

9:00 to 9:50 A.M. **SESSION 91** **DIVISION C**

STUDIES OF CREATIVITY AND ARTISTIC ABILITY

CHAIRMAN:

Rosestelle B. Woolner, Memphis State University

PAPERS:

A Socio-Economic Study of Creativity and Intelligence

INA R. RUBENSTEIN, Quinnipiac College, and
JAMES L. KUETHE, Johns Hopkins University

This study was designed to investigate some aspects of creativity in fourth-grade children from various socio-economic levels in a city school system. Over 350 were administered the Minnesota Tests of Creative Thinking, the Kuhlmann-Anderson Form D Intelligence Test, a verbal fluency test and a word association test. A course in creative problem solving was given to one class on each level. At the conclusion of the course the three experimental classes were retested, as was a control group individually paired with the experimental classes on the basis of birth date, sex, socio-economic level, IQ and creativity scores.

The results indicated that there was a significant improvement in the mean creativity scores of all three experimental groups as compared with the means of their matched control groups. (None of the other tests showed this.) The correlation between IQ and creativity was .48; between word association and creativity, .27; between verbal fluency and creativity, .55; and between verbal fluency and IQ, .60.

Thus it appears that there is a positive correlation between intelligence and creativity test scores, and that children can significantly benefit from a creative problem solving course.

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Relationships of Some Student Characteristics and Verbal Creativity

JOHN S. DACEY, Boston College, and
RICHARD E. RIPPLE, Cornell University

The relationships of 10 student characteristics and five measures of verbal creative performance of 200 eighth graders were examined. Student characteristics were: sex, mental age, sex-role identification, anxiety, constructive and unconstructive compulsivity, independence, dogmatism, convergent thinking, and organizational climate of the school. Measures of verbal creativity were of the paper-and-pencil type. They were: imaginative story-writing, flexibility, originality, fluency, and standardized total score on these four.

Correlations of each of the student characteristics with each of the measures of verbal creativity were computed. In addition, step-wise multiple correlation equations were computed for each measure of verbal creativity, using the combined student characteristics as predictor variables. Major findings were:

1. Unconstructive compulsivity (as was expected) was negatively correlated with verbal creativity, but constructive compulsivity has a positive correlation.

2. An "open" school organizational climate was negatively correlated with verbal creativity.

3. None of the student characteristics examined had relationships with verbal creativity as high as those reported in the literature subjects, older and younger than the adolescents in this study. Discussion of the results and their implications is presented in terms of adolescent development.

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Artistic Learning in American Schools: Some Empirical Data

ELLIOT W. EISNER, Stanford University

This study had three major objectives. First, it was developed to provide and validate three new instruments that would be useful for assessing (1) information about the visual arts, (2) attitudes toward the visual arts and (3) ability to analyze visual works of art in relation to their constituent qualities.

Second, it was designed to determine the extent to which information, attitudes and analytic abilities in art change over an eight-year period. To achieve this end students in grades nine through twelve at the secondary level and students from the freshman to senior year in college were tested.

Third, the study was designed to identify sex differences in performance on each of the instruments constructed.

Approximately 2,500 subjects, attending approximately 30 institutions located in eight states, were tested. It was found that the tests were internally consistent and that they were able to discriminate between populations interested in art and those randomly selected. It was also found that scores on the Art Information Inventory and the Art Analysis Inventory increase at about two points per year whether or not students are taking art courses in high school or college at the time of testing. Finally, it was found that females consistently receive higher scores on each of the inventories than do males and that attitudes toward art, as measured by the Art Attitude Inventory, remain remarkably stable during the four year high school period.

9:00 to 9:50 A.M. **SESSION 92** **DIVISION C**

GROUP RELATIONSHIPS AND GROUP BEHAVIOR

CHAIRMAN:

Joseph Gore, Washington University, St. Louis

PAPERS:

Person-Group Relationships and Some of Their Correlates in the Elementary School Classroom

OREN GLICK, Institute for Community Studies, Kansas City, Missouri

This paper explores the feasibility and utility of coordinating certain indices derivable from the Syracuse Scales of Social Relations (SSSR) to a theoretical person-group relationship model (r-space) developed by Jackson. Pupils from seven classrooms in both an inner-city Negro school and a suburban White school (grade levels 3-7) were the subjects in this study. One portion of the paper presents data pertaining to the validity of the coordination. Unstructured teacher judgments of pupils varied markedly with varying locations of the pupils in the r-space. Furthermore, the differential judgments were highly consistent with expectations derived from Jackson's theoretical model. A second portion of the paper presents results of data analyses on the relationships between the location of a pupil in the r-space and pupil anxiety, pupil self concepts, and pupil attitudes toward school. The study indicates that the social-psychological conditions within the classroom peer group are highly relevant to the total developmental process of the individual pupil, and that the conceptualization and operations of the person-group relationship space used in this study show considerable promise as a means of investigating such conditions and their effects.

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Student Role Congruence and Academic Achievement

HOWARD E. LAMB, University of Delaware

An individual achieves greater success within an institution when he either is able to perceive its goals and is willing to assume a role which is congruent with those goals, or does himself have goals congruent with that of the institution. With respect to the role of student within the school, it may be hypothesized that the congruence of institutional goals with student role perceptions is directly related to academic success. This sixth-grade study was designed to determine the relationship between scores derived from Q sort congruencies of student-reported *vs.* institutional-reported perceptions of student role expectations, and academic achievement as measured by standardized tests. Boys who reported more congruent role perceptions scored significantly higher in four out of six subtests of the Metropolitan Achievement series. No significant differences in achievement were found for girls.

Improving Communication Skills in Sixth-Grade Students Through Training in Role Taking

PATRICIA T. BOTKIN, University of California, Santa Barbara

The purpose of this study was to determine whether communication skills could be improved by specific training in role taking. The specific questions investigated were: (1) Can the acquisition of role taking aptitude be accelerated by formal training? (2) Can a method be developed to teach role taking to groups of students within the elementary school classroom?

Role taking is defined as the process of mentally putting one's self in the position of the other in an attempt to make an accurate assessment of his point of view.

A self-instructional program was developed to teach role taking and communication skills within the classroom. The program focused upon the specific ability of the speaker to assess the position (role) of the listener, identify the set of expectations appropriate to this role, shift to the position of the listener, and then recode information in terms of the needs of the listener.

Three sixth-grade classrooms were used, involving 75 students. Findings indicated that communication skills could be improved by specific training in role-taking skills. Correlations between intelligence, reading ability, and gains on the tests showed that the self-instructional program operated independently of intelligence and reading ability. Retention tests indicated that the gains made were not subject to a post-instructional decline; rather there appeared to be continued growth after the termination of the instruction.

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Teachers' Beliefs, Classroom Atmosphere and Student Behavior

O. J. HARVEY, MISHA PRATHER, University of Colorado,
B. JACK WHITE, University of Utah, and
JAMES K. HOFFMEISTER, University of Colorado

A study by Harvey et al. (1966) found that preschool teachers of more abstract belief systems produced more educationally favorable atmospheres in their classrooms than did teachers of more concrete beliefs. The present study focused on the effects of the concreteness-abstractness of teachers' beliefs on the classroom behavior of the children themselves. In addition, the classroom behavior of the teachers was rated.

Cluster analyses of classroom ratings of the children yielded seven factors of theoretical and educational import: (1) classroom socialization, (2) involvement, (3) activity, (4) nurturance seeking, (5) achievement, (6) helpfulness and (7) concreteness. Teacher ratings yielded three clusters: (1) dictatorialness, (2) resourcefulness and (3) punitiveness.

The more concrete teachers were more dictatorial, less resourceful and more punitive than their abstract counterparts. The students of the concrete teachers, as compared to children with more abstract teachers, were significantly less involved, less active, more nurturant seeking, lower in achievement and more concrete. In addition children of concrete teachers were less socialized, less helpful and more punitive, although not significantly so, than their counterparts.

9:00 to 9:50 A.M. **SESSION 93** **DIVISION D**

IMPROVING EDUCATIONAL RESEARCH

CHAIRMAN:

Howard W. Stoker, Florida State University

PAPERS:

A Theoretical Model for Research in Education

JENNY R. ARMSTRONG, University of Wisconsin, Madison

The purpose of this study was to develop a general theoretical model for research in education and to verify this model by an analytic review of research in mathematics education from its inception in 1897 with the early studies of Rice to the most recent reported studies of the large projects such as the Madison, School Mathematics Study Group, Illinois Projects and individual projects reported and sponsored through the U.S. Office of Education.

The results of this study indicate that this general model, when used to analyze research, points up specific, consistent fallacies in the research which has been done. Improved and more valid research designs for future research studies in Education are outlined with overcome these fallacies, and a general system using all possible, logical combinations of the elements of the model is developed for the design of future research studies. The results of this study also show areas of research which have been completely neglected. Designs for this type of research are also outlined.

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A Classification Scheme for Research Activities in Education

FRANK COOKINGHAM and TED W. WARD, Michigan State University

A clinical research procedure for educational activities is described which has three primary outcomes: (1) It trains practitioners to systematically use a diagnosis-prescription-treatment-evaluation approach to teacher-learning situations; (2) An easily revisable *explicit* model of good teaching behaviors, as defined by practitioner consensus and research support, is obtained for use in pre-service and in-service training; (3) The relations between particular teaching behaviors and relevant research findings are made explicit to serve as focal points for further investigation. A concrete example of such a procedure in current usage is presented.

It is shown how clinical research as defined in this paper differs from educational action research and applied research. The position is taken that the common distinction made between basic and applied research is misleading, and perhaps even an obstacle to progress in education. An alternative paradigm for research activities in education is proposed which attempts to more productively integrate those activities.

Editors Characterize Educational Periodicals

CHARLES M. GARVERICK, State University of New York at Buffalo, and
R. STEWART JONES, University of Illinois

Various efforts have been directed during recent years to the improvement of education through more research utilization. The AERA has a special committee for the problem, and the federal government has sponsored extensive retrieval systems such as ERIC.

A related aspect of research utilization concerns use that can be made of educational periodicals by students and by practicing professional educators. Without criticizing students, practicing educators, or periodicals, an attempt was made to secure impressions by the editorial staff of 53 periodicals related to areas of educational psychology.

Returns were received from 50 editors who made choices on a rating form of (a) most likely readers, and (b) most likely types of articles to be published in their periodicals. Results indicated that most readers were expected to be either researchers (in a university or institute) or college teachers. However, it was considered that most article types (other than pure psychological research or newsletter material) would have a good chance of being printed. In comparing readers with article types, editors reported that researchers and school administrators would be the most likely readers of a *variety* of article types.

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Teacher Lack of Familiarity with Research Techniques as a Problem for Effective Research Dissemination

EDWARD F. KRAHMER, University of North Dakota

The intense effort to disseminate research findings to a wide variety of people brings with it the question: Do these target people understand sufficiently the techniques and language of research to benefit from the dissemination efforts?

A survey was conducted as a prelude to proposed in-service training programs in research techniques. This survey involved submitting to a random sampling of North Dakota teachers and administrators (stratified by sex, years of teaching experience, degree, and educational position) a research article from the *American Educational Research Journal* judged to have general appeal to educators, and written in a clear, concise manner. A questionnaire concerning the research techniques used was included. The educators responded by indicating their attitudes toward the appropriateness of the procedures used and by indicating the sentence or sentences in the article which described the particular technique in question.

Judged by the responses to the question asking for comments, the respondents were quite confused by the article and, more so, by a number of the questions. Many reported they were unfamiliar with seemingly common terms such as hypothesis, variable, etc. Variance in responses to many questions occurred when considering variables such as sex, years of teaching experience, degree and educational position of the respondents.

An extension of this study involves comparing the responses of the North Dakota teachers with the responses from a random sampling of research oriented personnel as represented by Division D members. Results are included in the paper.

10:00 to 10:50 A.M. SESSION 100 DIVISION D

APPLICATIONS OF COMPUTERS

CHAIRMAN:

Rodney T. Hartnett, Educational Testing Service

PAPERS:

BIRS: A System of Computer Programs for Information Retrieval in Educational Research

JOHN F. VINSONHALER, Michigan State University

The task of locating and retrieving research information has become a major problem for most educational researchers. The present paper discusses the application of computers to this problem, utilizing the *Basic Indexing and Retrieval System.* BIRS is a set of general purpose computer programs which allow research scholars to use their own computer to construct the information retrieval system which best meets their needs.

Initially, the paper describes the design of BIRS which emphasizes three major criteria: *Portability* refers to the ease of implementation of the system at most computer installations. The system is designed for any computer center using Fortran. *Adaptability* refers to the degree to which individual scholars may adapt the system to their own information retrieval problems. In general, BIRS may be adapted to the development of any information retrieval system having certain characteristics. *Simplicity* refers to the ease of application by typical users. In general, BIRS is designed to be easily used by any educational researcher, regardless of technical training.

Next, the paper describes three typical applications of BIRS: to prepare a subject or author index; to generate an indexed book, consisting of a subject or author index and an organized printing of documents or references to documents stored in the computer; and to construct and maintain a question answering system in which the computer provides answers (in the form of internally stored documents or references to documents) to user questions (in the form of lists of topics).

The paper concludes with a summary of the information retrieval systems which are currently being developed with BIRS at Michigan State University.

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Multivariate Taxonomies and Geometric Sorting

BARY G. WINGERSKY, American Institutes for Research
and University of Pittsburgh (Marion F. Shaycroft)

One of the pressing problems in education research is the development of a replicable procedure for identifying subgroups of individuals having similar profiles in test batteries reflecting aptitudes, interests, or abilities. In this paper the problem of identifying high density subgroups in samples of points from multivariate space is considered in the light of the minimum cyclical path needed to traverse the sample points. Finding this minimum path through the points is equivalent to solving the traveling salesman problem in linear programming.

Since points that are close together will be joined by short segments of the minimum path, subgroups will appear as clusters about the minima of a plot of the segments of the path as ordinates against the integers.

The procedure is illustrated on replicate samples of students from the Project TALENT files, and with replicated samples generated by computer from multivariate normal distributions. Programming procedures are also discussed.

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A Factor Theory for the Adolescent Personality

Paul R. Lohnes, University of Pittsburgh

In 1960 Project TALENT collected the most complete measurement profiles ever assembled on a large probability sample of American high school youth. The profiles included 60 abilities tests and 40 motives scales. Factor analysis studies of error covariance matrices in a linear model, with sex and grade as design variables, yielded theories for latent structure of each of the trait domains, abilities and motives. In the abilities domain, the main factors are three core educational achievements (Verbal Knowledges, English, Mathematics) and three differential aptitudes (Visual Reasoning, Perceptual Speed and Accuracy, Memory). In the motives domain, the main factors are Conformity Needs, Scholasticism, Activity Level, and four interest traits (Business, Outdoors and Shop, Cultural, Science). The 11 factors in the theory for each domain are orthogonal in sex-grade subsamples. Relations between the domains have been explored by canonical correlation analysis. It is proposed that these factors represent suitable rubrics for a computer measurement system for secondary schools.

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Effects of Inapplicability of the Continuity Condition upon the Probability Distributions of the Student t-Statistic and the Mann-Whitney U-statistic

Jack N. Sparks, The Pennsylvania State University

Computer sampling procedures were used to draw random samples from a rectangular and a normal distribution. The Student t and the Mann-Whitney U statistics were computed for 5,000 pairs of samples of each of several sizes under the continuity condition and also under several degrees of violation of that condition. The resulting relative frequency distributions were compared with the theoretical distributions for the case of all conditions being met for each statistic.

In each case some deviations from theoretical distributions were found, these tending to become more extreme with the division of the measuring scale into fewer categories. Preliminary examinations indicated that decisions would often be affected if the condition was violated extremely and the Mann-Whitney U-test was used. Deviations were less extreme in the case of the Student t, and seemed unlikely to affect decisions often. Implications for the utilization of these statistical procedures in educational research were examined. Aspects of the situation were examined in an effort to determine what lines of attack should be taken in future research on the matter.

10:00 to 10:50 A.M. SESSION 102 DIVISION D

NEW APPROACHES TO INSTRUCTIONAL RESEARCH

CHAIRMAN:

Samuel T. Mayo, Loyola University

PAPERS:

The Use of Teaching Modules to Study High Level Thinking in the Social Studies

ANTHONY M. MCNAUGHTON, WILLIAM R. CRAWFORD, SHU-KIE HO, and NORMAN E. WALLEN, San Francisco State College (Hilda Taba)

The purpose of the study described here was to extract from the strategies of specially trained teachers, those elements or modules which produced high level thinking in Social Studies discussions. Modules represent an intermediate step between specific teaching acts and total teaching strategies. The procedures were: 1. The training of selected elementary school teachers in the systematic development of cognitive skills in social studies. 2. The development of a multidimensional code to describe the thought units in social studies discussions. Each thought unit was classified in terms of its explicit pedagogical function, whether disciplinary and management or thought related, and the level of thought involved. 3. The use of this code in analyzing the teaching strategies of specially trained teachers and extracting those segments of teacher behavior in class discussions which are followed immediately by high level thinking.

The important features which distinguish this from other studies of classroom behavior are: 1. An emphasis upon both cognitive processes and content in teacher training programs and in the coding of classroom discussions. 2. An emphasis upon detail in the study of classroom interaction.

It is hypothesized that teachers can incorporate these modules into teaching strategies which may be molded to the needs of a particular class on the basis of conditions and feedback.

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Auto-Instructional Response Mode and Anxiety as Factors in the Retention of Simple Verbal Material

SHELDON I. LACHE, University of Connecticut

Studies in programmed auto-instruction generally revolve about an examination of differences in achievement between subjects who study under "conventional" and those who study under programmed conditions. Conventional classrooms, however, are difficult to define. Carr (1960) suggested that greater effort be placed on investigating the parameters that influence the effectiveness of auto-instructional materials.

Response mode studies have left the literature with conflicting data. Students frequently find repetitive responding dull. The possibility exists that specific types of students would retain more information under specified response conditions. It is also possible that responses conditions can be altered, for time economy, to fit the materials to be learned.

The Text Anxiety Scales for Children and Lorge-Thorndike-Verbal, were administered to 494 eighth grade subjects. High, moderate, and low anxiety levels were determined for males and females. High and average verbal ability groups were determined.

Four program interaction modes were randomly assigned: Constructed Response, Optional Constructed Response, Covert Response, and Reading. For ten consecutive school days subjects worked with a linear type program, Vocabulary Program (Glock *et al,* 1964). Post-tests were administered at the end of instruction and after a two-week interval.

A 4 x 3 x 2 analysis of variance performed for each sex group yielded no significant differences for either main effects or interactions. The results of this study indicate the utility of examining programming approaches which do not utilize time consuming constructed responses.

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A Computer Corpus of Criticism for Assessing Poetry Explication

JOSEPH J. FOLEY, Boston College (George Madaus)

The paper reports the results of the use of the computer program called the General Inquirer, for literary criticism. A set of published protocols on one poem was processed by the General Inquirer. The results include psychological profiles both of the individual critics, and of the set of critics. The use of a corpus of criticism, held in machine memory, and accessible to the investigator for interaction, is discussed.

The study contrasts the feedback to the student available from the computer program with that customarily received following student explication of a poem. Among the implications discussed are those concerning both testing and instruction. For testing, the report to the examinee now maps his output against the psychological topography generated by the machine from variable input protocols. For instruction, the study comprises, in part, a heuristic approach to the literary problem of the affective fallacy, and the related psychological problem of the student's apperceptive mass.

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An Empirical Criterion Validation Study of Some Psychological Inventory Findings Related to Elementary School Teachers

SEYMOUR METZNER, Boston University

The purpose of this study was to investigate the validity of two psychological inventories, the Edwards Personal Preference Schedule and the A-V Study of Values, in terms of analyzing the behavior of a specific occupational group.

The group was elementary-school teachers.

Reported studies using the EPPS and Study of Values were employed to derive a theoretical profile of elementary-school teachers. This profile was then examined in relation to studies of teacher opinion and behavior in various areas of both personal and professional activity.

It was hypothesized that if certain motivational and value variables are typical of an occupational class, then valid instruments measuring these variables in sample groups of this class should show a relationship to actual behavior patterns of similar occupational sample groups.

The results of this study tend to support the above hypothesis as it relates to elementary-school teachers.

10:00 to 10:50 A.M. **SESSION 105** **DIVISION A**

SELECTION, PROFESSIONALIZATION AND MOBILITY OF EDUCATION PERSONNEL

CHAIRMAN:

Samuel Goldman, Syracuse University

PAPERS:

Superintendent Selection Patterns of Large City School Boards

JOSEPH M. CRONIN, Harvard University

Why do some large city school boards recruit and select for the superintendency an educator not then employed by that system? Why do other large city boards, with periodic exceptions, more often select "insiders?" This research report traces the selection decision in fourteen cities over the 50-year period 1915-1965 to see whether appointive and elective boards, scandals, civil rights efforts and other phenomena account for variations in practice. An analysis of one large city board's selection decision in the 1960s provides an opportunity to explain how elective boards face different pressures than do appointive boards in considering candidates from outside the system.

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Determining Who Shall Teach: A Professional Responsibility?

HERMAN A. WALLIN, The University of British Columbia

The literature of the practitioner is replete with references to a "professionalization movement in education." Students of the professions note similarities in the professionalization process — one being an occupational group's struggle to secure the legal right to determine entrance requirements. Is such a struggle taking place over the question of who shall be licensed to teach? Who are the protagonists? Who are the antagonists?

Such questions formed the basis for a questionnaire and interview study, sponsored by the Center for the Advanced Study of Educational Administration, Eugene, Oregon. The study population comprised 500 leaders in educational organizations, citizen groups, and legislators in state and provincial governments in the four west coast states in the United States and Canada.

Data revealed serious conflicts between major groups within the profession as well as between state departments and teacher organizations. Noneducational respondents do not perceive any movement by the profession to alter existing control mechanisms. This is in contrast to the perceptions of professional spokesmen. There appears to be little activity beyond the pronouncements of leaders of teachers' organizations. The presence of antagonists in state departments and administrator groups is seen as one deterrent to increased professional involvement with control questions.

The Relationship Between Teacher Personality Factors and Membership in Teacher Organizations

Richard C. Williams, University of California, Los Angeles

This study examined whether teachers who belonged to the Minnesota Education Association (MEA) differed from teachers of the Minnesota Federation of Teachers (MFT).

Form C of the *Sixteen Personality Factor Questionnaire* was administered to 404 MEA teachers and 172 MFT teachers. These teachers had been randomly selected from a population of 1426 teachers. The one-way analysis of variance was utilized; a level of .05 was considered a significant difference in personality characteristics between the two groups.

Factor B (Intelligence) was found to be the most consistent discriminator between the two organizations. In nine of seventeen comparison groups, MEA teachers were found to be significantly more intelligent than MFT teachers. To a lesser degree, the MFT teachers appeared more enthusiastic and less conscientious than MEA teachers. Older female teachers in the MFT appeared more imaginative than their MEA counterparts; older, experienced MFT teachers appeared more sophisticated than older experienced MEA teachers.

These findings and others indicate differences that should prove of value to those interested in understanding the characteristics of these two organizations.

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Characteristics, Degree of Satisfaction and Personality Needs of Mobile Male Teachers in Iowa

Dale Findley, University of Iowa

[No usable abstract]

10:00 to 10:50 A.M. **SESSION 106** **DIVISION C**

COMPARATIVE STUDIES OF SYSTEMS FOR ANALYZING CLASSROOM INTERACTION

CHAIRMAN:

Robert G. Shadick, Eastern Illinois University

PAPERS:

A Comparative Analysis of Selected Studies of Classroom Teaching

S. Greenberg, Hofstra University

The studies analyzed were those of Bellack, Flanders, Hughes, Smith and Taba. Some issues explored in this analysis are Bellack's "game" hypothesis, Flander's definition of freedom and spontaneity, Hughes' concept of imposition, Smith's view of classroom logic and Taba's postulated "levels of thinking".

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A Quantitative Comparison of Two Techniques for Recording Teacher-Pupil Classroom Behavior

Norman D. Bowers, Northwestern University, and
Francis X. Vogel, Central School, Evanston, Illinois

This study compared the information derived from two different methods of recording teacher-pupil classroom behavior. It was principally concerned with the question: are there significant differences in the nature and amount of information supplied by two different instruments, both of which claim to be concerned with teacher-pupil interaction? The classroom behavior of teachers and pupils were recorded using the Flanders' *Interaction Analysis Procedure* and the Medley-Mitzel *Observation Schedule and Record.* Trained observers worked as a team and simultaneously collected pairs of observations from 29 elementary school classrooms. Observations in each classroom were randomized as to time of day, as were assignment of instruments to observer for each teaching unit observation. Each classroom was observed for five different periods. A variety of comparisons were made, including both scales and individual items. This study offers evidence as to the likenesses and differences derived from the quantitative aspects of these procedures. Relationships between these instruments and selected points of teaching theory are also discussed briefly, together with comments involving the utility of the two techniques for the study of teaching.

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The Multiple Languages of the Classroom: A Further Analysis and a Synthesis of Meanings Communicated in High School Teaching

Norma Fields Furst, Temple University

This study views the teaching process as a complex of behaviors which may be objectively studied in classrooms using observational category systems. The major focus was the synthesis of several teaching variables and the relationship of these composites to pupil achievement. This study also presented descriptions of classroom interaction patterns. To do this, an affective category system (Flanders Interaction Analysis) was used to reanalyze classroom interactions which were previously analyzed by researchers using a cognitive system (Bellack).

Using findings and assumptions from studies which have focused on category analyses of classrooms, this study posited a composite of teaching behaviors which were assumed to be associated with pupil achievement: (1) teacher indirect behavior and (2) moderate amount of structure of activities (3) maximum pupil participation on (4) multiple cognitive levels (5) students receiving immediate positive feedback and with (6) a moderate pace of teaching activities. Variables (1), (3), and (5) were derived from the affective category analysis. Variables (2), (4), and (6) were adapted from data reported by Bellack.

The results indicated that there were significant differences between the high achieving group and the low and average achieving groups. The former had composites significantly more like the hypothesized teaching model than did the others. Further, there were descriptive differences among the three groups on Flanders measures.

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Two Types of Teacher-Learner Interaction in Learning by Discovery

Paul A. Twelker, Oregon State System of Higher Education, Monmouth

The project attempted to train learners in good problem-solving techniques (e.g., checking preliminary solutions before accepting them, shifting strategies to a solution rather than perseverating a single strategy, or using a tentative solution as a model for confirming the final outcome), hereafter termed "searching behaviors." The study was designed to overcome design and procedure limitations of previous research and to investigate two types of teacher-learner interactions: (1) encouragement to learners for exhibiting searching behavior, and (2) indirect guidance that channels the learner's thinking without revealing information to him. A third instructional mode provided learners with no opportunities to "search" as it is taught directly that information which learners in the other treatments were required to discover.

The subject matter taught was a distributive principle of arithmetic, presented in an augmented-human instructional system by means of taped recordings and slides over a three-week period in the Teaching Research Automated Classroom (TRAC). Student responses were monitored electrically.

On "near" transfer tasks, the group that was given no opportunity to search performed consistently better than the other two groups. However, on the savings transfer criterion, the discovery group that was given praise and indirect guidance excelled the other groups. The evidence indicates that these students were motivated to continue in a difficult learning task. This evidence corroborates previous work by Kersh and others, and has implications for identifying the unique role of the teacher in a discovery teaching experience.

11:00 to 11:50 A.M. **SESSION 110** **DIVISION C**

LANGUAGE BEHAVIOR AND DEVELOPMENT: I

CHAIRMAN:

Doreen R. Steg, Drexel Institute of Technology

PAPERS:

The Effects of Compensatory Education on Selected First Graders with Special Emphasis on Language Behavior

Marciene S. Mattleman, Temple University

Effects of a multi-sensory compensatory education program on 141 first graders of varied intelligence was studied over one school year. Differences between experimental and control groups in intelligence, academic achievement, and language behavior were tested by analysis of covariance. Additional data were quantified on fluency, vocabulary, and syntactic structure of oral language protocols.

While both groups gained in intelligence and academic skills, only reading achievement was significantly affected by mental ability and treatment alone. Interaction effect was significant for all other hypotheses. Analysis of language behavior revealed that first grade children use all the basic patterns employed by adults. Although part of the speech of first graders is fragmented, most is patterned. The oral vocabulary content of the disadvantaged child does not differ from that of a representative sample of children across strata. Although those of other groups might have described the same stimuli differently, words in the oral language protocols do not represent dialect differences. Despite non-verbal home situations, disadvantaged children do produce a great deal of language. Data from this study support the current thesis that stimulation, human or material, elicits increased oral language output.

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Improvement of Verbal Behavior in Two Preschool Children Through Systematic Social Reinforcement

K. Eileen Allen, Florence R. Harris, and Patricia Stoddard,
University of Washington (Howard N. Sloane, Jr.)

Systematic application of reinforcement procedures measurably increased the verbal behavior of two four-year-olds who had speech but seldom used it.

Subject 1: Three experimental periods, over 28 days. Period 1, *baseline:* verbal responses to adults over the 90-minute school session ranged between 2% and 5%; to peers, 2% to 10% of each preschool session. Period 2, *reinforcement of verbal responses to adults:* increase ranged between 18% and 43% to adults; remained at baseline level to peers, 2% to 9%. Period 3, *reinforcement of verbal responses to peers and adults:* verbal responses to peers, 7% to 41%; to adults, 30% to 38%.

Subject 2: Four experimental periods over 45 days. Period 1, *baseline:*

verbal responses to adults and peers ranged between 1% and 5% of the total school session. Period 2, *reinforcement of verbal to adults:* verbal to adults, 12% to 52%; to peers, 1% to 12%. Period 3, *reversal* (teacher attention non-contingent as during baseline): verbal to adults and peers ranged between 4% and 12%. Period 4, *reinforcement of verbal responses to peers:* responses ranged between 22% and 55%. Additional data are available demonstrating reduction of cueing and marked increase in S's self-initiated verbalization; other data describe improvement in the quantity and quality of S's social interaction.

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The Changes in Psycholinguistic Functioning of Children After One Year in an "Integrated" School

LOREN S. BARRITT, MELVYN I. SEMMEL, and PAUL D. WEENER,
University of Michigan

Children in the kindergarten and first grade from three school settings were tested with the Illinois Test of Psycholinguistic Ability (ITPA) in the Spring of 1965. One group of children attended a *de facto* segregated school (approx. 70% Negro). This school was closed during the 1965-66 school year. The predominantly Negro population was bussed to schools in the suburbs made up of predominantly Caucasian pupils. Group two was made up of children from the same geographic area as the first group but these children attended a different school (approx. 50% Negro) which continued to operate during the 1965-66 school year. Group three children were in attendance at schools scheduled to receive group one children. Group three children were predominantly Caucasian.

All of these children were post-tested in the Spring of 1966, with the ITPA. Selected results:

(1) The average gain in raw score points across all ITPA subscales was: 2.9 for Group 1; 2.8 for Group 2; and 3.7 for Group 3. (2) The greatest gain for Group 1 (the "integrated" group) was 4.4 points on the auditory decoding subscale. Group 2 gained the most (4.1 raw score points) on the Motor Encoding subtest. The children attending "receiver" schools (Group 3) showed the greatest gain, 8.3 points on the Motor Encoding subscale. (3) All groups increased their standing in comparison to the test norm group. Group 3 showed an average standard score increase across all subscales of +.44 points. Groups 1 and 2 gained +.17 and +.16 points respectively.

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The Immediate Memory Span of Children from "Advantaged" and "Disadvantaged" Backgrounds

LOREN S. BARRITT, MELVYN I. SEMMEL, and PAUL D. WEENER*,
University of Michigan

Three samples of children differing in socioeconomic background were asked to recall strings of information at four levels of conceptual difficulty:

(1) nonsense words, (2) high frequency nouns, (3) anomalous sentences, (4) meaningful sentences.

It was predicted based upon previous research (Barritt, Semmel, and Weener, 1966) that:

(1) Children would recall more information when previously established language habits were allowed to operate. Thus it should be easier for all children to recall six words in a meaningful sentence than in an anomalous sentence, and a six-word anomalous sentence should be easier to retrieve than a six-word string of high frequency nouns.

(2) Children from different socioeconomic backgrounds would become increasingly different in their ability to recall information as prior language habits (semantic as well as syntactic) were brought into use.

(3) Children at different grade levels (in this study first and second grades) would become increasingly different in the amount recalled as language habits were used. Thus first and second graders should be more alike on nonsense words than on meaningful sentences.

Results:

Predictions one and three were confirmed; prediction two was not. There were non-significant differences between children from different socioeconomic backgrounds at each of the four levels used in this study. The predicted interaction between list and group was not observed.

These results duplicate the findings of prior research with meaningless strings of numbers (Barritt, Semmel, Weener, 1966) but go beyond these earlier findings to demonstrate that the auditory memory of lower and middle class children is also similar on meaningful tasks.

11:00 to 11:50 A.M. SESSION 111 DIVISION B

TECHNIQUES IN CURRICULUM EVALUATION

CHAIRMAN:

Robert Glaser, University of Pittsburgh

PAPERS:

A Rationale and Plan for the Evaluation of the Individually Prescribed Instruction Project

C. M. Lindvall and Richard C. Cox*,
University of Pittsburgh

Individually Prescribed Instruction (IPI) is a procedure for individualizing instruction in grades K through six that has been developed at the University of Pittsburgh's Learning Research and Development Center during the past three years. A description of the program and the results of certain research studies that have been carried out as a part of the project were reported at last year's AERA meeting. This paper explains the design for evaluation that has been used in the development of IPI and that is being employed as the procedure is disseminated into a number of school systems throughout the nation.

The evaluation plan takes into account the fact that evaluation plays a key role in the *development* of a procedure (formative evaluation) as well as in making *judgments* concerning its worth (summative evaluation). For this reason, careful assessments must be made of such independent variables as the program plan and how it looks in actual operation, as well as such dependent variables as the changes produced in pupils and teachers.

Setting up specific procedures for gathering evaluative information with respect to each of these phases of the projects helps to insure that the evaluation procedure can serve all of its needed functions.

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Evaluating an Instructional Innovation Through the Observation of Pupil Activities

John L. Yeager and C. M. Lindvall,
University of Pittsburgh

In the dissemination of a rather carefully defined instructional innovation such as Individually Prescribed Instruction (IPI) it is essential that the actual classroom procedures that are used in the dissemination schools should be the same as those used in the original program. This means that the observation of classroom practices should be an important aspect of evaluation. The evaluation staff of the IPI Project developed a special Student Observational Form for obtaining a record of student classroom activities under this type of instruction. The form lists 33 pupil activities grouped under five major categories. An extended sampling of pupil activities in the Oakleaf School, the field laboratory in which IPI is being developed, provides normative data indicating the per cent of time that pupils spend on specific activities that are essential elements of IPI. The use of the instrument in dissemination schools has revealed specific ways in which practices differ from those that are used at Oakleaf. These results are then used to suggest changes in practice in the dissemination schools and, as such, are an important aspect of the *formative evaluation* of the project.

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An Analysis of Teacher Performance as a Step in Curriculum Evaluation

JOHN O. BOLVIN, University of Pittsburgh

One of the most crucial aspects of Individually Prescribed Instruction is that of the written prescription developed for each student since this is the means by which the teacher provides individual learning experiences for each of his students. This means that an important criterion in evaluating teacher performance under IPI must be the assessment of the teacher's ability to write effective prescriptions.

To create the prescription for an individual child at a specified time, the teacher is provided with the following kinds of information: (a) background information on the child such as age, family, and past achievement, (b) a placement profile by curriculum or subject area, and (c) pretest information for each objective in a particular unit for which the teacher is then ready to write a prescription. An analysis of the prescriptions written to date indicates two important factors: (a) the pretest information is the most important and most utilized single determiner, and (b) teachers tend to develop a style of prescription writing based on both the limited number of factors previously stated and their individual estimates concerning the necessary amount of practice and review in order to accept mastery of a given concept.

Specific questions that have been investigated in this study are: (1) How should background information be employed? (2) Are the prescriptions individualized for factors other than rate? (3) What type of information and training is necessary to effect change in the teacher's prescription writing technique?

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The Evaluation of Dependent Variables in a New Instructional System

RICHARD C. COX, University of Pittsburgh

After the independent variable has been adequately described the next step in the evaluation procedure is the identification of the dependent variables that may, hopefully, be affected by the innovation. The dependent variables can best be identified by reference to the goals of the new system.

One of the major sets of goals of the Individually Prescribed Instruction project, as with many innovative instructional systems, concerns pupil achievement. The evaluation of pupil achievement is not a simple matter, however, since there are a variety of ways in which this variable may be operationalized. To demonstrate this point, pupil achievement is defined in the three ways: (1) in terms of skills the pupil has mastered; (2) in terms of the pupil's score on standardized achievement tests in comparison with the test norms; and (3) in terms of the pupil's score on standardized achievement tests in comparison with other pupils. The results of these data clearly indicate that different operational definitions of pupil achievement produce distinctly different results.

11:00 to 11:50 A.M. **SESSION 114** **DIVISION D**

GRADING PRACTICES AND ACADEMIC SUCCESS

CHAIRMAN:

Willard G. Warrington, Michigan State University

PAPERS:

A Comparison of Differential Grade Prediction at Two Institutions of Higher Education

CLARENCE H. BAGLEY, State University of New York, Cortland

The purpose of the study was a comparison of predictive validity between two sets of predicted grade point averages in 36 subject matter areas as developed from normative data at two universities. The two sets of predicted grades were developed using the Iterative Predictor Selection Program for the IBM 709 computer following the Horst technique for multiple differential prediction. The Program determined for each subject matter area a corrected multiple correlation between 18 predictor variables and achieved collegiate grades. The two derived sets of predicted grades were compared to three-year summaries of achieved grades from a cross-validity sample of students.

The predictions derived from the multiple iteration procedures of the criteria of achieved grades of students at one university did not improve the correlations to achieved grades over the prediction grade point averages from the other university except in such special areas where the same title of subject matter masked different basic curriculum. Therefore the prediction of grades using normative data and prediction formula from one university, can generally be applied to students at another university, after appropriate validation research to eliminate special cases.

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An Investigation of Achievement Grading Based on Scholastic Ability Distribution

GEOFFREY MASON, University of Victoria

A system of assigning letter grades for classroom achievement based on the distribution of scholastic ability ratings in a class is commonly used in British Columbia schools. The claim that more realistic grading is obtained by this system is based on an hypothesis that the grades are grouped around a mid-point which is appropriate for the class. This study first investigated in 103 sixth grade classes the validity of the hypothesis of close correspondence between the means for achievement and for scholastic ability. Second, it compared (a) the grades assigned by 41 sixth grade teachers when left relatively unrestricted, and (b) the grades allocated in conformity with the scholastic ability distribution, with a criterion consisting of grades obtained by the use of district norms. After assigning Z-score values to the mid-points of the seven letter-grade intervals, it was found that approximately half the classes had a mean achievement within .2 Z of the scholastic ability mean. Achievement of low ability classes tended to conform more closely than that of high ability classes to the scholastic ability mean. When teachers were left relatively unrestricted in the assigning of grades, 22 were superior and 19 inferior to the grades obtained by using the scholastic ability system.

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A Comparison of the Predictability of Academic Success of Negro College Students with that of White College Students

Andrew C. Porter, University of Wisconsin, and Julian C. Stanley,
Center for Advanced Study in the Behavioral Sciences

The purpose of this study was to compare the predictability of academic success of Negro college students with that of white college students. Three analyses were done comparing predictive validities within the three Negro colleges of Georgia with predictive validities in the three four-year coeducational non-Negro colleges of Georgia whose students scored lowest on the SAT-Verbal and SAT-Mathematical.

The first design involved crossed, fixed-effects factors of race, sex, subtest, and six academic years, with random-effects factor, college, nested within race, but crossing all the other factors. The dependent variable was the coefficient of correlation between the respective SAT forms and average freshman grades, transformed to Fisher's Z. The other two analyses were of a similar design except they did not include the subtest factor and used as their dependent variables, multiple-predictor Z's from the least-squares linear combination of SAT-Verbal plus SAT-Mathematical; and SAT-Verbal, SAT-Mathematical, plus high school grades.

The results from all three analyses indicated that differences in predictive validities associated with race (other than the interaction of sex with race), subtest, and year are small or non-existent. White women were found to be more predictive than either Negro women or men, who in turn were more predictable than white men.

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An Investigation of the Reliability of Five Procedures for Grading English Themes

John C. Follman, University of South Florida, and
James A. Anderson, Wisconsin State University–Oshkosh

The unreliability of grading English essays has been widely documented in experience and research. Various evaluation systems and procedures have been developed to improve the reliability of grading English themes. While reliability scores have been obtained for many procedures few comparisons of different procedures have been made. This study was an attempt to determine the intrareliability of each of five different kinds of evaluation procedures and to use those reliability scores as a basis for comparison of the five procedures, *The California Essay Scale,* the *ETS Rating Scale, The Follman English Mechanics Guide,* the *Cleveland Composition Rating Scale,* and an *"Everyman's" Scale* in which each rater individually judged the essay by the criteria of his discretion.

Mean reliabilities for each system group of five raters were generally high within each system, while they were less high for the individual rater. The intercorrelations of mean group scores for evaluation systems were high for all systems except the ETS system.

It was suggested that the high intercorrelations between systems which obtained were determined by the homogeneous nature of the raters with respect to the factors that determined their evaluation scores rather than to any sensitizing and/or organizing properties of the evaluation systems themselves.

12:00 to 12:50 P.M. SESSION 120 DIVISION B

CURRICULUM RESEARCH

CHAIRMAN:

Robert L. Baker, Arizona State University

PAPERS:

Interim Report: Long-Range Effects of Various Curricula on School Performance of Disadvantaged Preschool Children

KATHLEEN CLAGETT and CARROLL A. CURTIS,
Pennsylvania Department of Public Instruction, Harrisburg

In seven Pennsylvania school districts, comparative assessments were made, at entrance to kindergarten and first grade, of the cognitive and language performances of disadvantaged children exposed to "enrichment" nursery. The first year showed significant differences on four of eleven criterion variables.

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Children's Concept Learning in Geography Under Two Experimental Curricula

CHARLOTTE CRABTREE, University of California, Los Angeles

This research developed and tested two experimental curricula in geography for grades one through three. Curriculum A systematically introduced new subject matter from the structure of geographic theory. Curriculum B experimentally modified the California social studies curriculum by emphasizing major generalizations in geography. Hypotheses predicted (1) no significant between-programs difference would obtain in children's knowledge of geographic features and functions; (2) subjects enrolled in Curriculum A would evidence significantly higher achievement in understanding of the core concept of geographic theory and ability to apply the concept (areal association) appropriately in analyzing unfamiliar geographic regions.

Procedures included (1) a one and a half year developmental period when the curricula, instructional materials, and criterion instruments were developed and refined; and (2) a one-year experimental period when the two curricula were introduced in 12 intact classrooms, matched for grade level and randomly assigned to each program. Pretest measures served as covariance controls in adjusting final criterion scores. Results by analyses of covariance indicated: (1) no statistically significant between-programs differences were obtained in first grade subjects' achievement on the three criterion scales; (2) statistically significant between-programs differences ($P < .05$) were obtained in grades 2 and 3 in children's understanding of and ability to apply the core concept of areal association in geography. Implications for curriculum were drawn.

Operant Conditioning of Number Concepts in Trainable Mentally Retarded Children

NANCY L. PETERSON and ROBERT L. EGBERT,
Brigham Young University

Operant conditioning techniques were investigated for developing number concepts in retarded Ss with IQs between 30 and 50. Following the administration of a pretest to determine level of conceptual development, nine Ss who demonstrated minimal or no concept of numbers were given daily 20-minute conditioning sessions over a three-week period. The Ss were conditioned on a semi-automatic apparatus using flexible conditioning procedures and small candies as reinforcement. Upon completion of the conditioning sessions, a posttest, identical in part with the pretest, was administered to each subject.

Results showed significant differences in frequency of correct responses between the first and last thirty conditioning trials at the .01 level for number "2" and at the .05 level for number "3." Significant differences were found between pre- and posttest scores for the total group on each of several subtests. A significant difference of .01 was also found between the total pretest performance for the Ss as compared to posttest performance. This significant difference along with a subject by subject analyses of pre- and posttest performance also revealed generalization of conditioned learning to number tasks not specifically conditioned such as counting, making number sets, etc.

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Differences in Learning Resulting from Teacher and Student-Centered Teaching Methods

CLARK D. WEBB and J. H. BAIRD,
Brigham Young University

The purpose of this study was to determine if there is a significant difference in learning between students completing a college teacher education course on a Continuous Progress (a form of independent study) basis and those who complete the same course on a conventional lecture-discussion basis.

The experimental group (Continuous Progress) met in a formal class situation only twice during the semester. Each student proceeded through the course material independently and at his own rate. The control group learned under the conditions of the traditional lecture-discussion approach to teaching.

An objective examination, administered as a pre- and a post-test was devised to serve as the measuring instrument. Scores of the two groups were compared; post-test scores were also compared for those students in each group having the ten highest and the ten lowest grade point averages.

At the .01 level a significant difference was obtained in favor of the experimental group. Comparison of post-test scores indicated no significant difference between the ten students in each group having the highest grade point averages; however, a difference significant at the .05 level was found between the ten lowest in each group.

12:00 to 12:50 P.M. SESSION 122 DIVISION C

CORRELATES OF ACADEMIC ACHIEVEMENT

CHAIRMAN:

William F. White, University of Georgia

PAPERS:

Use of Two Personality Inventories in Predicting Several Classroom Achievement Criteria

CARL SPIES, Kent State University

The Edwards Personal Preference Schedule (EPPS) and the Guilford-Zimmerman Temperament Survey (G-ZTS) were used to predict three criteria of learning in a military training situation. These criteria were pass-fail, final status and residual gain in achievement. Not only was the significance of the personality variables as predictors ascertained, but the unique contribution of these personality variables to a multiple correlation with several aptitude measures was determined. The aptitude measures were the General Classification Test and the Arithmetic Test from the Navy Basic Test Battery.

The following personality variables were significantly related to the pass-fail criterion: from the EPPS, n-Achievement at the .01 level of significance and n-Affiliation, n-Change, and n-Endurance at the .05 level; and from the G-ZTS, the emotional stability, restraint, objectivity, friendliness, and masculinity scales at the .05 level.

For final status, n-Achievement at the .01 level and restraint and sociability at the .05 level were significant predictors. For the residual gain criterion, n-Achievement at the .01 and n-Deference at .05 level were significantly related to the achievement. After partialing out aptitude effects, only the following personality variables were related to achievement: n-Achievement for all three criteria; n-Deference with the residual gain; and n-Change and emotional stability with pass-fail criterion. Thus for each of the three criteria, at least one personality variable was significantly related to classroom achievement with effects of aptitude held statistically constant.

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Effect of Security as an Independent Variable on Selected Variables Related to Perception, Cognition, and Academic Achievement

NEWELL T. GILL, JUDY SEARS, BARBARA WITTEN, LINDA LOUGH, and MARTHA BREWER, Eastern Kentucky University

From reviewing various theories of psychology related to an individual's adjustment, his perceptual and cognitive style, and his effectiveness as a person, the question arose as to the effect security may have on the other three variables. To explore this problem 249 college students enrolled in a teacher education child study program were divided into three groups according to their performance on Maslow's S-I Inventory. They were then administered Rokeach's Dogmatism Scale (Form E) and Thurston's Closure Flexibility Scale. A complex analysis of variance (2x3) was employed to explore differences between the three groups and between sexes as to their performance on the cognitive and perceptual tasks and their grade point averages. No differences between sex were found on any of the three variables. Secure groups were less dogmatic than insecure groups. This was more true of females than males. No significant differences were discovered between groups on the perceptual task. Secure groups had a higher mean grade point average than insecure groups. An analysis of the results and their implications for educators is discussed.

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Attitudinal and Intellectual Correlates of Attention: A Study of Four Sixth-Grade Classrooms

Henriette M. Lahaderne, University of Chicago

This study was concerned with whether children's attentiveness in class is related to their attitudes toward school, on the one hand, and to their achievement and ability, on the other. Pupils in four sixth-grade classes (N = 62 boys, 63 girls) were observed, and each pupil's attention to the main class activity was recorded on a schedule devised by Jackson and Hudgins (Hudgins, 1966). Two instruments designed to assess students' satisfaction with their school and their teacher were administered. IQ and achievement test scores were obtained from school records.

There were two major findings. First, there was practically no relation between students' attitudes and the measures of attention. Fifteen of the 16 correlation coefficients describing this linkage clustered around an average value of .10. Thus, according to these data, a child's attention in class does not reflect his feelings toward his school or his teacher. Second, a positive relationship was found between measures of the students' attention and scores on achievement and intelligence tests. This set of correlations ranged from .37 to .53. In short, the attentive pupil tended to be above average in achievement and intelligence.

These results raise questions about the meaningfulness of the general concept of attitudes when applied to school affairs. They also call for a closer look at the conjoining of attention and achievement. Alternate ways of viewing these phenomena are suggested.

The Relationship Between Learning of Adults and Their Prior Participation in Formal Educational Activities

Douglas Sjogren, Colorado State University, and
Alan Knox, Teachers College, Columbia University

Recent past experiences in educational activities has often been considered to be an advantage for an adult in a new educational activity. The basis for this generalization has primarily been from the results of Sorenson's study in the 1930's and often with the interpretation that the advantage is not from greater prior knowledge but from a knowing how to handle a new learning situation.

Four experiments were conducted in the reported project on a sample of adults. The adults were classified among other ways on their recency of participation in an adult education activity. A significant participation effect was observed in each experiment. When pre-test scores and WAIS verbal and performance scores were controlled by analysis of covariance, however, the significant effect due to participation or non-participation in adult education failed to hold up. The results suggest that the participant's advantage stems from a broader background of knowledge and information than from any unique manner of dealing with new learning situations.

12:00 to 12:50 P.M. **SESSION 123** **DIVISION C**

CLASSROOM QUESTIONS

CHAIRMAN:

Thomas B. Goodkind, University of Connecticut

PAPERS:

Reading Comprehension Development as Viewed from the Standpoint of Teacher Questioning Strategies

FRANK J. GUSZAK, University of New Mexico

The research problem was concerned with (1) a description of reading comprehension outcomes called for by teacher questions, (2) the incidence of congruence or incongruence between teacher questions and student responses, and (3) the description of the interaction patterns involved in the foregoing.

Instruments were developed for the measurement and description of the outcomes and interaction factors. Relative to the outcomes dimension was the Reading Comprehension Inventory which contained the following major categories: literal comprehension, translation, inference, and evaluation. Criteria for determining congruence and incongruence were determined. Describing the interaction aspects of question-response activity were the Question-Response Unit and the Question-Response Episode. The former described the anatomy of the basic interaction unit while the latter expressed the nature of relationships between basic units.

The results revealed that most teacher questions called for literal comprehension and were immediately met with congruent responses. Further results revealed that teachers rarely related subsequent questions to previous questions. The total picture suggested that strategies were infrequent which would appear capable of stimulating pupils to activate higher thinking abilities about reading. Rather, the strategies found appeared to program students for a very limited response activity.

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The Influence of Analysis and Evaluation Questions on Achievement in Sixth Grade Social Studies

FRANCIS P. HUNKINS, University of Washington

The objective of this study was to determine whether in social studies text-type materials, a dominant use of analysis and evaluation questions, as defined by Bloom's *Taxonomy,* would effectively improve the social studies achievement of sixth grade pupils.

Two hundred and sixty pupils enrolled in eleven sixth grade classes of a large suburban school system served as subjects. Classes were randomly assigned to either experimental Condition A, dominant emphasis (50 per cent) on analysis and evaluation questions, or Condition B, dominant emphasis (90 per cent) on knowledge questions.

A social studies achievement test, designed by the investigator, served as a pre- and post-test criterion measure. During the four week experimental period, specially prepared materials were employed by pupils in each treatment condition. Classroom teachers coordinated these materials. Analysis of covariance was the principal method utilized in analyzing the data obtained:

1. Pupils receiving the dominance of high level questions (Condition A) demonstrated significantly higher scores in social studies achievement than did pupils receiving the dominance of low level questions (Condition B).

2. Reading level exerted a significant influence upon the level of achievement for pupils in both conditions.

This study provides evidence which suggests that replications would provide valuable information with regard to the influence of types of questions on pupils' achievement.

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Teaching Science for Creativity — A Taxonomy of Pupil Questions

NATHAN S. WASHTON, Queens College, City University of New York

The study (in progress) is a compilation of junior high school science students' questions representing at least 15 different schools. The questions are analyzed in relation to pupil motives and class behavior with the view of developing a taxonomy. The taxonomy may perhaps be used by science teachers to make a rapid diagnosis of potential questions that can be used by the teacher to help develop creative learning in science by the pupils.

The concept of creativity is developed as a result of problem solving activities, research and independent study, and open-ended experiments. Students are urged to identify and state problems as well as be able to solve them. They are encouraged to propose several and not just one hypothesis. Several factors such as the social climate of the classroom, pupil-teacher interaction, etc., are discussed in relation to creativity.

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Competence Revisited

MARTIN L. MAEHR, Concordia Senior College, Fort Wayne, Indiana

Robert White's theory of Competence Motivation has prompted some discussion, much acknowledgment, but little or no research. This paper isolates the basic postulates of the theory and suggests revisions which would enhance its utility. Specifically, the paper argues that White's theory may be appropriately restated in choice and decision theory terms. It is, secondly, proposed that a person's judged competence to perform a task or his subjective probability of success is the crucial index in predicting his task preference.

Presumably, the relationship between judged competence and task preference is linear under conditions of high extrinsic reward. However, it is argued that under conditions of low extrinsic reward the relationship is curvilinear. Individuals are then inclined to do that at which they are only moderately competent. Likewise, a moderate amount rather than a maximum of success feedback would be most effective in retaining interest and attention.

One implication to be drawn from this theorizing is that classroom learning — which typically occurs under moderate extrinsic reward conditions — should not necessarily be designed to provide maximum positive reinforcement. Negative reinforcement, being wrong, risk of failure can be desirable components in programmed as well as classroom learning. Preliminary research to justify these assertions will be cited and briefly reviewed.

1:00 to 1:50 P.M. SESSION 133 DIVISION C

LANGUAGE BEHAVIOR AND DEVELOPMENT: II

CHAIRMAN:

W. L. Bashaw, University of Georgia

PAPERS:

Intraverbal Associations in Sentence Behavior

Joan L. Prentice, Indiana University

The purpose of the present study was to identify pre-existing associations between words as a variable influencing our choice of words during the process of sentence construction. The hypothesis was that the response probability of a given lexical item in a sentence will be increased if a prior association obtains between that item and another item used in the construction. In the first experiment, 32 *Ss* engaged in a paced recall task. Materials were sets of three sentences which varied only in two non-associated embedded adjectives. Second adjectives were similar in meaning, and could be interchanged without gross distortion of original sentence meaning. Each second adjective was a low-frequency word-associate to a first adjective embedded in one of the two remaining sentences of the triad. The second adjective was omitted from each sentence during the recall trial. Errors of re-pairing second adjectives in sentences were analyzed in a repeated-measures anova. Adjectives were erroneously recalled in sentences having a word-associate reliably more often than they were erroneously recalled in sentences having no word-associate. These results indicate that, in a recall task, intraverbal associations play a role in the lexical selection process in sentence construction. The second experiment required the deliberate composition of sentences, given alternative words for each of two slots in a sentence frame. Booklets containing sentence frames and adjective-alternatives adapted from Experiment 1 materials were completed by 60 *Ss*. Word-associates were put into the same sentence reliably more often than were non-associates. Sentences embedding word-associates were rated more fluent than sentences embedding non-associates. It was concluded that intraverbal associations influence the selection of words in sentence generation.

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Semi-grammaticalness in the Free Learning of Sentences

Robert E. Davidson, The University of Wisconsin

Violating the rules of grammar produces deviant, or semi-grammatical, utterances. This experiment was designed to reveal the behavioral consequences of rules violation. Specifically, the hypothesis under test was that performance in the free-recall of sentences is a function of the number of selectional rules violated in an utterance.

College-age *S*s served in an independent groups factorial design with three controls. Over five study-test trials, the *S*s learned nine verbal strings concatenated as adjective-noun-verb-adjective-noun. The grammaticalness factor had three levels; zero, one, or three selectional violations.

The results indicated that semi-grammaticalness has an effect in human performance. Recall for verbal strings showed increasing decrements as a function of the number of selectional violations. A repeated measures analysis allowed a more sensitive evaluation of the semi-grammaticalness construct. For example, mean contrasts at the sentence element (formative) constituent level indicated that, whatever the level of semi-grammaticalness, the learning of nouns is superior to the learning of adjectives and verbs. This suggests that nouns act as anchors to define the meaning and structural relationships within sentences. Contrasts at higher constituent levels (phrases) suggested that increases in syntactic rule violations have increasing differential effects on the constituents.

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Language Habits and The Syntax of Subject Matter

PAUL JOHNSON, The University of Minnesota

Since many of the words which serve as labels for the concepts in a subject matter are part of a student's vocabulary before he experiences the formal instruction of that subject matter, it is reasonable to inquire into the nature of the language habits which relate these words and into the role of such language habits in performances involving the concepts. A portion of the data presented in this paper indicate that the contiguous occurrence of the verbal labels for concepts during instruction is not sufficient to account for the language habits which appear among these words in association. Some of the associative relations among the words in a subject matter can be derived from a representation of the logical structure of the subject matter, while others map into the relations which exist among these words prior to formal experience in the subject matter. Data are also presented concerning the relationship between pre-instruction language habits, some psychological scales of relation, and problem solving. It is suggested that for certain early stages of acquisition pre-instruction, language habits may function not only as rules for combining the elements of a subject matter, but also as rules about how the rules within the subject matter itself are to be applied.

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Some Differences in Encoding and Decoding Messages

WENDELL W. WEAVER, University of Georgia, and
A. C. BICKLEY, Campbell College

The purpose of this study was to examine language encoding and decoding processes through determining the ability of subjects to predict omissions from a natural language text which they had previously produced themselves, as contrasted with the ability of other subjects to predict omissions from these same texts, which they had read at the time of production.

There were two experimental and two control treatments. The experimental conditions were *encoding* a group of subjects produced written stories to two TAT cards, and *decoding* — a group of 16 subjects read the productions of the *encoding* group.

The dependent variable was cloze tests, made by deleting every seventh word of the material produced by the *encoding* group. The encoders received deletions of their own productions while the decoders received deletions of the production of the encoder which they had previously read.

The statistical analysis was by planned comparisons among means. The major experimental comparison was that between the encoding and decoding groups. This comparison was statistically significant at the "pre-chosen" .01 level of confidence.

A discussion of the theoretical import this difference and of similar differences found in two previous pilot studies completes the paper.

1:00 to 1:50 P.M. **SESSION 137** **DIVISION A**

NEW PROBLEMS AND APPROACHES IN EDUCATIONAL ADMINISTRATION

CHAIRMAN:

Bill Monahan, University of Iowa

PAPERS:

Belief Congruence Theory and School Integration

SAMUEL L. WOODARD,
Genesee-Humboldt Junior High School, Buffalo, N.Y.

This study tested the Rokeach theoretical formulation that belief congruence transcends race.

General hypothesis: There is no significant difference between attitudes of Negro and white parents of similar socioeconomic status toward junior high schools of varying racial balance attended by their children in Buffalo, New York.

Related question: Do attitudes of parents differ as racial balance of schools or racial identity of parents differs?

Index of socioeconomic status: Education.

Randomly selected parents (150) were matched by educational level; their attitudes were measured by a questionnaire. The proportion of Negro students enrolled in the three schools ranged from 15 to 99 per cent.

The hypothesis was not supported. There were significant differences by race. School acceptance scores were uniformly lower for Negroes. No relationship existed between school racial balance and parental attitudes, but there was a trend toward greater school acceptance as the percentage of Negro students decreased.

Rokeach's theory that belief congruence transcends race does not hold for the school integration issue in the context of this study. The principal reason appears to be: Persons who perceive an issue, such as school integration, to threaten their self-esteem and/or status are likely to conform to institutionalized norms of the social structure, and manifest racial prejudice, which can preclude the possibility of belief congruence transcending race.

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A General Systems Formulation of Work Relationships

R. OLIVER GIBSON, State University of New York at Buffalo

Work relationships may be viewed as exchange relationships between and among systems. Development of such a formulation rests upon concepts of *system, boundary, structure, openness-closedness, system ideology, contract* and *energy*. The contract is viewed as the linking system between the employing and employed systems, whether individual or group.

Collective negotiations provide an interesting area for shaping the formulation. What are relevant system and boundary definitions? To which do the following belong: supervisor, principal, or superintendent? How is openness-closedness related to the *rate* and the *content* of the exchanges? If a system is boundary-maintaining, how will critical boundary areas differ in openness-closedness? How do systemic ideologies such as *school board autonomy* and *professionalism* relate to the nature of exchanges, energy allocation, and contracts?

The formulation generates a number of lines of inquiry taking into account, where they are available, findings that relate to work relationships. Further implications are also explored: (1) Turbulence can be expected when the point of boundary-contact between systems is in an area critical to system-maintenance. (2) Points of boundary sensitivity relate to systemic ideology and affect differential openness-closedness along the boundary. (3) Exchange is a function of openness-closedness. (4) Work contract creates an overlapping system structuring exchange processes and energy allocation. These and related propositions may be examined either in terms of the individual worker or groups of workers.

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Dynamics of Interpersonal Interaction: A Study of Consultation Among Graduate Students in a Beginning Statistics Course

DOUGLAS R. PIERCE, University of Minnesota

The paper demonstrates that social exchange theory is capable of generating empirically testable hypotheses. Predictions about the systematic distribution of interpersonal interaction were derived from social exchange theory: specifically, predictions were made regarding the initiation, stabilization, and subsequent change of consultation activity.

Graduate students in a beginning statistics course constituted a population within which the predictions were tested. Interaction among 115 students was recorded over a five-week period during a 1966 Summer Session at the University of Minnesota. Observed interaction was compared with interaction predicted on the basis of scores on a pre-test and certain student attributes, including saliency and anticipated difficulty of the activity. Performance on midterm and final examinations provided a basis for predictions about stabilization and subsequent change of interpersonal interaction. Separate indices of giving help, receiving help, and engaging in mutual study activity facilitated description of the extent of equivalence which prevailed. Scales on which subjects indicated to what extent they valued the help they gave and received, supplemented by open-ended questions, yielded leads to account for discrepancies in the exchange of activity.

Norms and Expectations for "Research Oriented" Public School Personnel

JOHN C. EGERMEIER, Oklahoma State University, and
GAYLEN R. WALLACE, Southwestern Cooperative Educational Laboratory

An attempt was made to map role behaviors and characteristics peculiar to "research oriented" public school personnel. In view of the belief that educational change is dependent upon increased involvement of classroom practitioners in research and dissemination activity, it is imperative that the teacher-researcher role and possible strains and conflicts associated with it be clarified.

A team of University personnel met with selected elementary, junior high, high school, and administrative personnel from ten large school systems to elicit information in unstructured form regarding the present status of research thought and activity in the schools, to identify research oriented teacher behaviors and characteristics, and to obtain responses to four instruments derived primarily from output of the work sessions.

Using sociological role study format for behaviors and semantic differential (bi-polar adjective pairs) format for characteristics, "ideal" and "real" judgments were obtained. Kruskal-Wallis one-way analysis of variance and Mann-Whitney U statistical tests were used.

Conclusions: The four respondent groups differed significantly in mapping both "real" and "ideal" role behaviors and characteristics for the research oriented teacher. Within-group comparisons of "real" vs. "ideal" indicate that members of all groups considered themselves unsuited in a number of ways for research-related roles in the school.

2:00 to 2:50 P.M. **SESSION 140** **DIVISION B**

CURRICULUM EVALUATION

CHAIRMAN:

Carolyn D. Wilkerson, Southwest Regional Laboratory for Educational Research and Development

PAPERS:

A Rationale Including Multiple Criteria for Evaluation of the Objectives of School Programs

NEWTON S. METFESSEL, University of Southern California, and
WILLIAM B. MICHAEL*, University of California, Santa Barbara

It was thought helpful, in light of evaluation requirements in federally sponsored school programs, to set forth a rationale for such evaluation. The key steps include: (1) the development of a cohesive model of goals and objectives arranged in a hierarchial order from general to specific outcomes in both the cognitive and non-cognitive domains; (2) the formulation of relevant criteria concerning what characteristics are to be measured and subsequently placed in the scheme of evaluation; (3) the translation of the relatively more specific objectives into operational terms relative to the educational procedures and measures employed in assessing behavioral change; (4) the involvement of as many individuals as possible from various segments of the school community who are participating either directly or indirectly in the program to be evaluated; (5) the employment of as wide a range of relatively objective instruments as possible, with recourse to relatively subjective instruments where necessary; (6) the establishment of "values" on the totality of measures collated and summarized through careful and comprehensive procedures that draw conclusions concerning how meaningfully and significantly each of the stated objectives has been achieved. A list of more than 70 criteria that may be utilized in assessing programs is included.

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The Central School Project: An Attempt to Evaluate the Effects of an In-Service Program and an Experimental Form of School Organization

FRANCIS X. VOGEL, Central School, Evanston, Illinois, and
NORMAN D. BOWERS*, Northwestern University

Utilizing the faculty and pupils of one entire elementary school as an experimental group, and comparing their behavior with two carefully defined control groups, this study evaluated (1) the effects of T-Group training and (2) a nongraded form of school organization. Pupil variables included conceptual maturity, attitudes toward school, group performance and achievement. From teachers, data included responses to personality and attitude inventories and biographical data. Teacher and pupil classroom behaviors were recorded by use of direct observational techniques. These data were analyzed to assess changes in responses during a school year. Data relating to classroom climate were analyzed for change from spring of one year to spring of the next year.

Results relating to the effects of T-Group training supported evidence available from one earlier study: for certain defined groups of teachers, the T-Group experience appeared effective in furthering teacher-pupil relationships and maintaining a given type of classroom climate. Results relating to the organizational experiment (the nongraded school) explored data somewhat different from other studies dealing with the nongraded school but indicated no clear difference. The uniqueness of this study resides in the attempt to evaluate, through objective data, the effects of a definitive in-service educational program for teachers coupled with an experimental school organizational scheme.

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A Study of Student Preparation and Achievement in Grade Nine Modern and Traditional Mathematics Curricula

HOWARD H. RUSSELL and LESLIE D. MCLEAN,
Ontario Institute for Studies in Education

The purpose of the study was to provide quantitative assessments of the strengths and weaknesses of a modern mathematics program at the Grade 9 level by comparison with the traditional program that preceded it. A standardized test of mathematics achievement was especially constructed for the project, providing sub-scores on four levels of complexity and eight topical categories. A factorial design was used, incorporating treatment, school, option group and sex; and prior measures of MA, math achievement and pattern perception were available for use as covariates ($N = 396$).

A multivariate analysis of variance, using the various sub-scores and category scores as dependent variables, indicated significant differences, not on total score but on the highest and lowest levels of complexity and in some topical categories. Covariance analysis clarified a pattern which indicated strength for the modern treatment at the highest level of complexity, and strength for the traditional treatment at the lowest level of complexity.

The data yielded clear indications as to the differences in performance, between the college-bound students and the non college-bound students — the non college-bound operating at only 2 or 3 points above chance scores. Also, substantial interaction between school and treatment provided clear indication that the effects of modern and traditional treatments vary substantially from school to school. Teacher-treatment interaction could not be isolated, because teacher and option had been confounded in an effort to avoid confounding teacher and treatment.

The Development of Intellectual Abilities of Seventh Grade Students in Modern and Traditional Mathematics Programs

Berj Harootunian, University of Delaware, and
Florence E. Fischer, Towson State College

The purpose of this study was to compare the development of intellectual abilities, other than mathematical skills per se, of seventh graders in modern and traditional mathematics programs. Since modern mathematics programs such as SMSG claim among other things to develop reasoning ability and "to provide examples of rigorous exact thinking," it is important to check such claims empirically.

Six tests measuring various intellectual constructs were administered to the two groups in early October. The same students were retested in late March and early April. Approximately 80 modern and 90 traditional mathematics students were present for all tests at both sessions. Several of the tests have been either devised or used by Guilford and his associates to identify a number of factors in his structure-of-intellect model. The factors elicited by the tests include ideational fluency, sensitivity to problems, and conceptual foresight. In addition, judgment and evaluation, constructs which are factorially complex, are measured.

Since the modern and traditional samples differed significantly in their pre-test performance, the changes for the two groups were compared through covariance analysis. When initial differences were accounted for, no significant differences were found between the experimental groups in intellectual growth on the variables considered. The results are discussed in terms of curriculum theory and teacher education.

2:00 to 2:50 P.M. SESSION 141 DIVISION B

READING AND LANGUAGE

CHAIRMAN:

Vernon S. Gerlach, Arizona State University

PAPERS:

Language Habits in the Behavioral Sciences: Their Role and Representation in Instruction

WILLIAM E. GARDNER and PAUL JOHNSON,
University of Minnesota

The claim that concepts from the behavioral sciences can be taught at any level has implications for curriculum development that have not been sufficiently examined. One problem in this issue concerns the confusion between a logical and a psychological representation of the concepts in a subject matter. This investigation focuses upon the relationship between the language habits which involve the words that represent concepts in the subject matter of a behavioral science and the logical structure of these concepts as they appear in Project Social Studies curriculum materials developed at Minnesota.

Subjects were seventh graders who studied concepts from sociology over a five-month period. Indices were obtained of their language habits by means of verbal association. The stability of these language habits was related to the prominence which the words played in the verbal instruction of the subject matter. A classification of these language habits suggests that curriculum materials designed to represent the subject matter of a behavioral science involve not only the categories of relation among the concepts in the logical structure of the subject matter, but also the categories of relation which may exist among the verbal labels for these concepts both prior to and during instruction.

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The Use of Maps and Exemplars in English Composition Instruction

ROBERT M. RIPPEY, University of Chicago

This replication of a study reported at last year's conference essentially substantiates the findings of the previous year. It was found that carefully organized units of instruction, directed at specific objectives, could produce significant changes in student writing behavior over a period of time as short as six weeks. On the other hand, objectives normally taught in the same course, using conventional methods, seldom showed significant changes during the year's duration of the course. In measuring the changes in writing behavior, seven scales were developed. Inter-rater reliability for the scales ranged between .73 and .86.

Developmental Changes in the Subsystems of Reading and Listening

HARRY SINGER, University of California, Riverside

To test the gradient-shift hypothesis of the substrata-factor theory of reading and to discover developmental changes in the subsystems of reading and listening, a battery of 28 variables, selected on an a priori basis to assess input and mediational subsystems in the visual and auditory modalities, was administered to 223, 283, 262, and 159 pupils in grades 3, 4, 5, and 6. From the resulting correlation matrices for these grades, five to six components whose eigenvalues were greater than 1.0 were extracted by the method of principal components, and were varimax-rotated. Kaiser and Bianchini's analytical technique for relating factors was then used to intercorrelate the components from grade to grade. The results revealed that (a) speed and power of reading are interrelated multidimensional abilities throughout grades 3 through 6, but qualitatively and quantitatively different organizations of factors enter into their development; (b) concomitant with development of general reading ability, auditory and visual subsystems become more closely integrated and function as a more centrally mediated communication system, and this integration has a facilitory effect upon both speed and power of reading.

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A Longitudinal Evaluation of Reading Achievement in Small Classes

IRVING H. BALOW, University of California, Riverside

In 1962-63 an experimental primary-grade reading program that reduced class size by fifty per cent (at little cost to the District) was initiated in seven Riverside, California schools. In 1963 six schools were added, and in 1964 eight more participated. Reading achievement scores for each group were compared each year by analysis of covariance. Success of the total program was determined by comparisons of beginning fourth grade reading achievement for the four groups (Group I — three years in small classes, Group II — two years, Group III — one year, and Group IV — no small classes). All analyses controlled IQ, reading readiness, and/or reading achievement of the previous year. Important findings include: (1) at fourth grade level Group I scored significantly above Group II, which in turn scored significantly above Groups III and IV; (2) boys in small classes scored significantly above boys in large classes but girls did equally well in large or small classes; (3) the salutary effect of small classes was found at the highest as well as the lowest ability levels; and (4) the small classes had their greatest effect in the first grade.

2:00 to 2:50 P.M. SESSION 142 DIVISION C

CONTRIBUTED PAPERS

CHAIRMAN:

James Raths, University of Maryland

PAPERS:

A Comparison of a Discovery Teaching Strategy and a Traditional Discussion Strategy

EDWIN HIRSCHI, University of Arizona, and
MILTON O. MEUX, University of Utah

The purpose of this study is to compare the immediate effects of a discovery teaching strategy with a more traditional discussion teaching strategy.

Twenty-four ninth grade students were matched by pairs on a combination of IQ, achievement, and teacher judgment, and assigned randomly to the two strategy groups.

Each group was taught two mathematical concepts —"sum of the divisors of N" and "perfect number"— by the same teacher, one concept in the morning and one in the afternoon. No communication was permitted among the Ss and the teacher except during the strategies. The strategies were tape recorded and transcribed. At the end of the second strategy, the Ss were given a test covering both concepts, the test including both free-response and multiple-choice items. There were no differences between the two strategy groups on the test.

The two kinds of strategies were analyzed by the B. Othanel Smith system for teaching strategies and found to consist entirely of concept, rule, and procedure ventures, with essentially the same distribution for each strategy. Analysis of the transcribed strategies in terms of other classroom observation systems is illustrated to clarify further the dimensions on which discovery and traditional strategies differ.

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The Application of the Cloze Technique to the Study of Grammatical Proficiency in Retarded and Normal Children

MELVYN I. SEMMEL, LOREN S. BARRITT, STANLEY W. BENNETT,
and CHARLES A. PERFETTI, The University of Michigan

This study is part of a larger investigation designed to evaluate the role of grammatical habits in the language functioning of retarded and normal children. Four groups of 20 children each were tested: institutionalized retardates (I-R); public school retardates (PS-R); a group of normal Ss matched with the retardates on chronological age (CA-N); and a normal group matched on mental age (MA-N). Forty simple four-word sentences were constructed to produce five equally-represented sentence types, differing in the sequential ordering of the grammatical classes. The words were systematically deleted to yield an equal number of deletions across sentence types for each of the four positions.

The results showed significant effects due to position of deleted word, form class, and sentence type. Performance of both normal groups was consistently superior to that of the retarded groups, but an interaction indicated that retardate performance significantly improved when the deleted word was located in the final position. The *adjective-adjective-noun-verb* sentence type was the most difficult for all groups, while the *adjective-noun-verb-adjective* type was the easiest. With respect to form class, nouns and adjectives were most easily replaced, except in the I-R subgroup where nouns and verb slots were most easily completed. Performance on the cloze sentence completion task was found to be related significantly to paradigmatic responding in a word-association task, after partialling out the effect of mental age.

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Precision in Research on Mathematical and Other Meaningful Language: More on the Set-Function Language

JOSEPH M. SCANDURA, University of Pennsylvania

A set-function language has been proposed by the author as a substitute for the S-R mediation language. In the SFL, the principle, rather than the association, is the basic unit of behavior in meaningful learning. The concept and association are viewed as special cases. The advantages of SFL are: (1) an explicit distinction is made between what is learned, observable inputs and outputs, and observable representations (e.g., statements) of what is learned, (2) complex learning can be simply represented, (3) the relationship between transfer (generalization) and what is learned is made explicit — particularly how new responses can be made to new stimuli, (4) a distinction is made between observable properties which determine responses and those which determine when a particular bit of knowledge is to be applied, and (5) the context in which behavior obtains finds a natural representation as do hierarchies, chains, and knowledge (e.g., Taxonomy of Educational Objectives) categories.

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Perception, Achievement, and Intelligence

JOHN R. BERGAN, University of Arizona

This research investigates relationships among perception (size constancy, shape constancy, spatial orientation and speed of processing information), achievement (California Reading Test, Stanford Achievement Test, a word reversal test, and the Gates Diagnostic Reading Test) and intelligence

(Kuhlmann-Finch Tests). Size constancy was defined as adjustment of a variable disc to match a standard presented at various distances; shape constancy as adjustment of a variable ellipse viewed obliquely to perceived circularity; spatial orientation as adjustment of a rod to the apparent vertical under conditions of body tilt; and speed of processing information as recognition of words and phrases flashed on a screen and followed by interfering stimuli (nonsense syllables). Sixty seven-year-old second grade boys and girls participated. A principle components factor analysis and varimax rotation were performed yielding five factors: achievement, speed of processing information, shape constancy, spatial orientation, and size constancy. There was little relationship among the perceptual variables suggesting that perceptual ability is not a general ability. Speed of processing was found to be highly related to achievement (especially reading) and intelligence. Spatial orientation was related to arithmetic achievement and intelligence, and shape constancy was negatively correlated with the tendency to make word reversals.

8:00 to 8:50 A.M. SESSION 151 DIVISION C

STUDIES OF READING IN THE EARLY SCHOOL YEARS

CHAIRMAN:

William Fowler, Yeshiva University

PAPERS:

A Pilot Study of the Effects of Visual Perception Training and Intensive Phonics Training on the Visual Perception and Reading Ability of First Grade Students

RAYMOND A. ARCISZEWSKI,
Rutgers University and Millburn (N. J.) Public Schools

The pilot study involved 34 students in two first grades in a middle-class school district. One group of children received training as outlined in the Frostig Program for the Development of Visual Perception while the other group was given intensive phonics training in reading.

The two groups were matched in terms of visual perception, as measured by the Frostig Test of Visual Perception, intelligence, as measured by the SRA Test of Primary Mental Abilities, and sex. The teacher variable was equated by having the two teachers alternate in teaching the classes.

At the end of the 21-week experimental period the children were retested with the Frostig Test to measure their gain in visual perception. A standardized reading test (Gates Primary) was also administered to determine the reading level of the children.

It was found that students who received perception training made significant gains in perception at the .01 level of confidence when compared to students in the group receiving phonics training.

The analysis of variance technique was also used to compare the scores of the two groups in reading. No significant difference in reading ability was found between the perception and phonics training group.

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Grapheme-Phoneme Regularity And Its Effects on Early Reading: A Pilot Study

PAUL M. KJELDERGAARD and ROSELYN FRANKENSTEIN*,
University of Pittsburgh (C. M. Lindvall)

A reading experiment was conducted utilizing materials which regularized sound-symbol correspondence. The regularity was achieved by teaching only one phoneme for each consonant grapheme and by color coding vowel graphemic configurations. A special font was used to enhance discriminability among the graphemes, e.g., b-d, and to represent unsounded letters. A kindergarten class of 20 five year olds (Sept. mean age of 5 years, 3 months), was used to simulate the formal aspects of first grade reading instruction. The subjects, divided into the traditional three ability groups, were taught using a flannel board (letters), a pocket chart (words), and special printed materials (stories). Daily 20-minute lessons involved sounding elements, blending sounds into words, and reading sentences and stories.

A pre-program test battery, selected from pilot study predictors, was administered in September at the beginning of the program. In May the children were given special tests, relating to the contents of the program, and the Metropolitan Achievement Test. The median grade equivalent scores on the latter were 2.5, 2.3, and 1.7 on Word Knowledge, Word Discrimination, and Reading, respectively. These tests, viewed jointly, indicated that the children were able to generalize to standard print and to read words and graphemic configurations not previously encountered in the program.

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Stimulus-Relevant Verbal Behavior as an Indicator of Reading Performance among Kindergarten Children

DAVID FORD, The University of Wisconsin

Both Shire and Yedinack have found that retarded-reading primary school children have significantly poorer vocabularies than their superior-reading peers. These results, however, are not interpreted by the authors. Accordingly, it was the purpose of this study to investigate reading acquisition and verbal performance among kindergarten children. Four transfer of training tasks with 16 subjects each (eight boys and eight girls) were chosen. Low meaning trigrams were paired with common geometric forms to simulate language and reading acquisition conditions.

Measures of verbal response to individually presented picture stimuli were obtained. Measures of stimulus relevant (texting), situationally relevant (tacting plus texting) and situationally irrelevant (echoic and intraverbal) verbal behavior were obtained from each child. Results indicate a moderately high negative correlation between the number of stimulus specific verbal behaviors and the number of serial plus random trials on two of the four transfer of training tasks: (1) CVC trigrams to geometric designs, and (2) CVC trigrams plus geometric designs to CVC trigrams, while low to moderate correlations were found for two others: (1) CVC trigrams plus geometric designs to geometric designs and (2) geometric designs to CVC trigrams. Some sex differences in measures of language production were found but the results favor neither sex.

Follow-up in the Second Grade of an Experiment Comparing the Use of the Initial Alphabet and the Traditional Alphabet in First-Grade Reading

ROBERT E. CHASNOFF, Newark State College, New Jersey

In 1964-65 seven pairs of matched first-grade classes were taught reading, writing, and other language activities by a single teacher in each school. In each pair of classes one class was taught only with the Initial Teaching Alphabet (i.t.a.), and the other with the traditional alphabet. Outcomes for all second graders were compared with the t-test statistic to test hypotheses.

1. On the five language sections of the Stanford Achievement Test, Primary II Battery, Form W, there was no significant difference between the over-all grade scores of the populations who originally had comprised the experimental and control groups.

2. There were no significant differences for four individual sections of the test: Word Meaning, Paragraph Meaning, Spelling, and Language. For one section, Word Study Skills, grade scores were significantly higher in favor of the original experimental group population. However, no significant difference was found when raw scores were used for comparison but the direction favored the experimental population.

3. Judges rated typewritten transcriptions of writing samples on a five-point scale, using established criteria for rating communication effectiveness. No significant difference was found between the experimental and control populations.

8:00 to 9:20 A.M. **SESSION 153** **DIVISION C**

CHARACTERISTICS AND TRAINING OF STUDENT TEACHERS

CHAIRMAN:

W. Warren Kallenbach, San Jose State College

PAPERS:

A Comparison of Different Modeling Procedures in the Acquisition of a Teaching Skill

D. W. ALLEN, D. C. BERLINER, F. J. MCDONALD, and F. T. SOBOL*,
Stanford University

This study was concerned with the modification of the teachers' oral questioning behaviors. Teacher trainees were used as subjects with the goal being to increase the frequency of what are generally called higher order questions.

Different training procedures were utilized to answer three questions: First, some groups read written scripts while other groups saw the enactment of the scripts. This analysis dealt with the question of symbolic versus perceptual modeling. Second, groups were differentiated on whether or not they received examples or examples mixed with non-examples of the behavior to be learned. Finally, groups were distinguished according to whether they matched the model exactly by performing the same lesson as the model, or whether they matched the model in principle using any lesson for instruction.

TV tape recordings were made during micro-teaching training sessions. A fourth practice session in which all teacher trainees had to switch lesson content and incorporate the questioning skill was used for an immediate transfer test. Analysis of the tapes provided information about the three procedural questions which are concerned with maximizing the effects of training with models.

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Interpersonal Sensitivity Training for Teachers: An Experiment

BRUCE R. JOYCE, Teachers College, Columbia University

The primary experiment tested the effects on the teaching styles of teacher trainees of a "sensitivity training program" utilizing role-player simulations of learners. Experimental and control groups were matched for age, academic achievement, and personality variables. Experimental Ss received a three-part sensitivity training program. In the first part, discrimination of interpersona sensitivity was the goal, through the analysis of motion pictures and tape recorders, of teachers illustrating sensitive and non-sensitive behavior. In the second phase, self-discrimination was emphasized. (Ss taught role-players who manifested specific behavior patterns, motion pictures and tape recordings were made of these lessons and were fed back to the experimental Ss with coaching.) The third phase included more teaching of role-players, with further feedback and positive reinforcement of progress.

Effects on the teaching styles of the trainees were determined by taking samples of classroom teaching behavior from control and experimental Ss before and after the sensitivity training program. Six samples were collected from each. Several theoretical hypotheses were tested.

With respect to the practical effects on teaching styles, there were apparently substantial effects on question-asking behavior and on rapport-building aspects of teaching styles. However, ability to discriminate and utilize learner cues apparently was not affected, nor was supportiveness in the classroom, or behavior intended to explore student feelings or purposes.

The experiment permitted comparison of the teaching styles of teacher trainees when teaching role-players and when teaching in normal classroom situations. Styles in the two situations were apparently very similar and for two-thirds of the Ss the styles were identical. The restrictedness of the teaching styles of the subjects may have contributed to the finding. The results raise several methodological questions about the study of interpersonal sensitivity and interpersonal strength as aspects of teaching styles.

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A Situation Testing Approach to Assessing Teacher Trainees

DAVID E. HUNT, Syracuse University

A simulated teaching situation was derived to assess a trainee's capacity to react sensitively and modulate effectively to a learner's frame of reference in communicating information. The trainee's task was to convey the concept of the balance of power in the Federal government to a Venezuelan immigrant (role-player) who wanted to pass his citizenship examination but who, during the presentation, reacted by misunderstanding what the trainee said in a predetermined fashion. Trainee performance was coded according to how much the trainee sought information about the learner's frame of reference and how effectively he modulated the presentation to this frame of reference, both components apparently being related to *sensitivity.*

Another simulated teaching task requiring the trainee to control and regulate the classroom behavior of three learners will also be described which provides an index of *strength.* One or both of these tasks have been administered, along with more traditional paper-and-pencil tests, to several hundred trainees — Peace Corps teacher trainees, applicants for an urban teaching preparation program, National Teacher Corps trainees, etc.

The paper will primarily summarize results of these assessment programs by considering inter-rater reliability, inter-task generality, construct validity, and predictive validity of the sensitivity and strength measures, and also consider briefly other applications of this approach.

The Influence of Feedback on Empirically Derived Student Teacher Concerns

FRANCES F. FULLER and OLIVER H. BOWN,
University of Texas

Statements in typescripts of tape recorded seminars of two groups ($N = 6$, $N = 8$) of student teachers meeting for 12 weeks with one or two counseling psychologists, were categorized by covert concern topic. A six-stage concerns sequence, replicated with a third similar group ($N = 8$), ranged from beginning concern with self-protection (school power structure, class control, content competence, supervisors' evaluations, etc.) to later concern with pupil experiencing (content relevance, interaction, etc.).

Using Maslow's hierarchy of needs, it was hypothesized that: (1) in non-counseled groups, concern with self (stages I through IV) would appear early and concern with pupils (IV through VI) would appear late; and (2) counseled groups would have fewer worries related to self-protection and more worries related to pupil learning than non-counseled groups.

Hypothesis 1 was partially confirmed. In non-counseled groups, stage I and II concerns appeared early; stage IV and V concerns were infrequent both early and late; stage VI concerns did not appear at all. Hence late stage expected frequencies did not justify either chi square or Fisher's exact test. This finding is consistent with previous empirical results.

Hypothesis 2 was confirmed. A different, essentially random group of non-volunteers ($N = 13$) from the same population was required to have, one year before student teaching began, a psychological test interpretation, individual counseling and film feedback (seeing their own sound films). When blind ratings of anonymous concerns secured in the middle of the student teaching semester were compared, counseled student teachers had significantly fewer self-protective worries and more pupil learning worries than the three non-counseled groups ($N_1 = 26$, $N_2 = 16$, $N_3 = 16$) (chi square = 21.59, $p < .001$).

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Student Teacher Preferences as Predictors of Their Teaching Behavior

R. G. FRANKIEWICZ and P. R. MERRIFIELD,
Kent State University

The degree to which a teacher identifies with role-components in the teaching situation may well influence that teacher's classroom behavior. The latest in a series of studies on this problem is an investigation of the validity of four role-component scores from the *Stern Teacher Preference Schedule* as predictors of five teaching-behavior scores based on measures selected from the OScAR.

In one previous study, the 20 scales of the STPS were administered to 99 student teachers prior to their student-teaching experiences. In a second study, the OScAR factors, based on measures obtained during student teaching, were defined. In a third study, zero-order correlations among the twenty STPS measures and five OScAR composites showed that eight STPS measures in various combinations were related to seatwork, affection, and problem structuring.

In the current multiple-correlation study, these relationships were clarified by using the more reliable and interpretable factor scores computed for the four STPS predictors and five OScAR criteria. The behavior of utilizing seatwork was a function of the role-components of professional pride and hierarchy of management ($R = .25$, $p < .05$); affectionate classroom behavior by the teacher was related positively to affiliation with pupils and negatively to practical goal orientation ($R = .35$, $p < .01$).

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Logical Consistency in Ideas About Teaching Held by Student Teachers

HARRY R. WEINSTOCK, Kansas State University

The GNC Scale of Logical Consistency of Ideas About Education was utilized in a study of 94 secondary student teaching seniors in the spring of 1966. The purpose was to determine (a) the logical consistency and philosophical orientation in their conceptualization of teaching and (b) its relation to their student teaching program and other scholastic criteria.

Comparison on GNC performance both within and between the sciences, humanities, and professional teaching fields were made (a) at the beginning of formal education course work in February, (b) at the beginning of student teaching in March, and (c) upon return to course work in May. Relationships between logical consistency and performance in education courses, student teaching, methods, and university grade point average were also determined.

It was concluded that (a) a large proportion of the student teachers are logically consistent in their thinking about teaching, (b) their largely empirical orientation may reflect a more scientific outlook in formal education course work, (c) certain education courses may improve the level of logical consistency of physical education and business education students, whereas student teaching participation may lower this level, and (d) the lack of positive relationship between logical consistency and student teaching grades raises questions about the grading practices used in awarding such grades.

8:00 to 8:50 A.M. SESSION 154 DIVISION D

STUDIES OF HIGHER MENTAL PROCESSES

CHAIRMAN:

Kenneth F. McLaughlin, U. S. Office of Education

PAPERS:

A Cross Cultural Comparison of the Factor Structure of Selected Tests of Divergent Thinking

GEORGE F. MADAUS, Boston College

This study compared the factor structure of three distinct samples on selected tests from the Minnesota Tests of Creative Thinking. The Figure Completion, Circles, Unusual Uses, and Product Improvement tests of the Minnesota battery were administered to 609 ninth and tenth graders, to 65 teachers from a Chicago suburb, and to 203 children of equivalent grade level in two schools in Dublin, Ireland. Total verbal and total non-verbal fluency, flexibility, originality and elaboration scores, gained by combining each of the four scores from the two verbal and two non-verbal tests, were used in the analysis.

While the mean scores for each sample differed considerably, the results of a principal components factor analysis showed almost identical patterns for each of the samples. In each case, only the first two eigenvalues were greater than one, the first accounting for between 52 and 62 per cent of the variance. In each case, the second factor was a contrast between the verbal and non-verbal sub scores. Rotation resulted in a clear distinction between the verbal and non-verbal tests. Separate factors for each of the four distinct sub test scores did not materialize. A redundancy between sub test within both the verbal and non-verbal tests was found to exist, raising the question of the trait-method problem.

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Cognitive and Non-cognitive Correlates of Creative Achievements

STEPHEN P. KLEIN, Educational Testing Service, and
RODNEY W. SKAGER, University of California at Los Angeles

A stratified random sampling plan was used to select 1,800 high school seniors. Stratification was based on sex, school size, community size, and per cent going to college. These students took an instrument, the Independent Activities Questionnaire (IAQ) that provides information about outstanding achievements in several areas, e.g., science, art, music, and leadership. The IAQ is designed to inhibit faking and to provide scores for both the quantity and quality of achievements. Several ability, interest, background, and personality measures that were judged to be related to creativity were also administered.

Significant positive correlations were obtained between IAQ scores and almost all of the variables hypothesized to be related to creativity. Some of the major correlates were verbal ability, divergent thinking tests, socioeconomic status, drive, self-assertiveness, and an interest in reading. There were, however, major differences between sexes and between achievement areas in the patterns of relationship, e.g., school size was related only to the girls' IAQ scores. These results are compared to conflicting and congruent findings of other research efforts on creativity. Also discussed is the use of the IAQ in measuring the quality of education and predicting future achievements.

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Application of Image Analysis Techniques in the Development of a School Anxiety Scale

KEITH McNEIL and BEEMAN N. PHILLIPS,
The University of Texas

The purpose of this study, which was part of a larger U.S.O.E. supported project, was to develop and to determine the factor structure of a School Anxiety Scale. A 198-item Children's School Questionnaire (CSQ), containing items from various research instruments designed to measure anxieties conceptually related to school anxiety, and items measuring different aspects of defensiveness, proneness toward neuroticism, and other characteristics of children, was administered to a representative sample of more than 300 children from diverse socioeconomic, ethnic, and racial subgroups at the beginning of fourth grade, and again at the beginning of fifth grade; and principal components and varimax rotation (using only eigenvalues above 1.00) analyses were performed on the image covariance matrices which were obtained from these item responses. A school anxiety factor, and a defensiveness factor were two of the four factors identified in the CSQ analyses which were found to have high similarity from one year to the next; and in subsequent image and factor analytic analyses of these two sets of items it was found that school anxiety was composed of four specific factors, tentatively identified as anxiety associated with negative valuation by others, anxiety associated with taking tests, anxiety associated with self-expression, and anxiety associated with physiological reactivity; and it was found that defensiveness was composed of two factors — approach style of defensiveness and avoidance style of defensiveness. In addition, KR 21 internal consistencies and stability coefficients across the year were quite satisfactory, although the identification, internal consistency, and stability of these underlying dimensions have not yet been verified with another, independent sample.

Similarity of the Dimensions of Self As Object and Self As Process

R. Robert Rentz and William F. White,
The University of Georgia

The purpose of the present study was to determine if the dimensions of self as object are, in fact, dimensions of the same phenomena as self as process, or self as personality. Specifically, it was hypothesized that instruments purporting to measure self as object are assessing dimensions of the same phenomena as a standard personality inventory.

*S*s were 138 male and female undergraduate students enrolled in a course of Educational Psychology. The self as process was measured by the *16 Personality Factor Questionnaire* (16 PF), whereas the self as object was measured by a self descriptive inventory, *Tennessee Self Concept Scale* (TSCS), and an adaptation of the Osgood Semantic Differential (SD) containing 12 bi-polar adjective scales. On the SD, *S*s rated two concepts: "my actual self," and "my ideal self."

The 36 self as object variables (12 TSCS; 24 SD) were factor analyzed and 9 rotated factors were identified: (1) Self-acceptance, (2) Self-strength, (3) Self-activity, (4) Ideal self-evaluation, (5) Defensiveness, (6) Actual self-evaluation, (7) Hot-cold, (8) Conflict-integration, and (9) Active-passive. When a canonical correlation analysis was performed between the 9 self as object factors and the 16 self as process factors (16 PF scores) 3 of the 9 canonical correlations were significant ($P < .001$). The results indicated that the self as process subsumed the dimensions of self as object, and yet did point up independent aspects of personality.

8:00 to 8:50 A.M. **SESSION 156** **DIVISION B**

ATTITUDES AND VALUES

CHAIRMAN:

John T. Flynn, University of Connecticut

PAPERS:

The Relationship Between School Self-Evaluation Procedures and Changes in Teachers' Expressed Attitudes in Six Areas of Professional Human Relations

DALE V. ALAM, Michigan State University

In an attempt to determine attitude shifts in teachers over time and under varying circumstances, a highly reliable instrument was completed by over 600 Florida teachers from 21 schools in ten separate counties on a pretest-posttest basis with a seven-month interval.

The major questions for study related to whether teachers' expressed attitudes shift over time, and, if so, in which direction. Also asked were questions dealing with teacher involvement in the recommended procedure for school self-evaluations as prescribed by the Southern Association of Colleges and Schools and the effect of this involvement on the expressed attitudes of teachers.

It was found that teachers' expressed attitudes tend to become less favorable over time, significantly so in attitude shifts toward the students and the principal, less significantly toward other teachers and not significantly toward the profession, the school, or the community.

Involvement in the school self-evaluation process had no effect on the expressed attitudes of teachers.

In an effort to measure degree of involvement and attitude shifts, there was some evidence to suggest that those schools most involved tended to produce favorable attitude shifts.

Another finding was that there are wide differences in expressed attitudes of teachers from predominantly Negro and white faculties.

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Teacher Attitudes Toward School Practices as a Function of the Values of Staff Members

ROBERT EMANS, Temple University

The central hypothesis of this study was that conflicting values are related to a lack of acceptance of the school's curriculum on the part of the faculty. Two types of values were studied, general and educational.

The data for this study were collected through the employment of three instruments (Differential Values Inventory by Prince, an adaptation of the Kreitlow Scale by Kreitlow and Dreier, and the Teacher Attitude Scale adapted from various instruments) and a background information questionnaire. The instruments were administered to approximately three hundred teachers, principals, vice-principals, and supervisors.

School faculties which expressed the greatest differences in *educational* values also expressed the greatest amount of disapproval of the school's curriculum. However, when subjects were studied as one large group, teachers with extreme values indicated more favorable attitudes toward the curriculum than teachers with more neutral values. The values held by principals were related to teacher approval of the curriculum. Teachers tended to hold *educational* values similar to their principals, but tended to hold *general* values different from their principals. Subsidiary findings are reported concerning the relationship between general and educational values and the relationship between certain demographic variables, general values, educational values, and school approval.

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Using Controversial Issues to Develop Democratic Values Among Secondary Social Studies Students

KENNETH H. HOOVER, Arizona State University

In previous factor and cluster analytic studies, Hoover & Schutz have identified five basic homogeneous and reliable dimensions of democratic values. These dimensions represent basic values which individuals normally acquire during the natural acculturation process.

The current study was designed to determine if the previously identified values could be developed in secondary social studies classes. Focusing upon controversial issues, curriculum materials were developed which logically seemed to relate to each of the identified values. These were placed in the hands of three Arizona secondary social studies teachers, who were subsequently instructed in instructional techniques of problem solving.

The experimental design employed was the Nonequivalent Control Group. Differences between experimental and control groups (by teacher) were determined by two criterion measures: Hoover Attitude Scale and Semantic Differential Scales administered before and after the study. Analysis of variance technique on each of the criterion measures was employed.

The results clearly indicated that the approach was effective in building the democratic values studied. Despite the fact that no changes were observed in a few of the concepts studied, the results were most encouraging. They suggested that basic values of secondary school youth can be modified when instructional emphasis of a problem solving nature is directed to current controversial issues as employed in this study.

A Fundamental Role for Values in Psychology and Education

MAURICE E. TROYER, Syracuse University

Three propositions are considered: (1) Value orientations of individuals and groups have energizing and direction giving components. (2) Values operating basically in the affective domain tend to make individuals and groups bias prone. (3) Values operating in the cognitive domain have potentiality for bias reduction.

Since John Dewey only a few social psychologists and some psychoanalysts (mainly Jungian) have regarded values for their energizing and direction giving components. General psychology texts omit values from the chapters on motivation. Duke's review of research on values in 1955 shows values as almost universally regarded in the affective domain.

The thesis is here emphasized that values are a fundamental category of high level motivation, and that they can and should operate more frequently in the cognitive domain as well as the affective domain. The latter portion of this paper illustrates a process for lifting value operations from the affective to the cognitive domain using current "struggles" between university students and administrators as a laboratory. This process is based on group data and case studies on the roles of students, faculty and administration in university policy and decision making, too complex and extensive to be reported here. The major purpose of the paper is to illuminate a blind spot in psychological and educational research that deters useful attacks on important problems.

8:00 to 8:50 A.M. **SESSION 157** **DIVISION C**

CONCEPT LEARNING: III

CHAIRMAN:

Louis J. Rubin, University of California, Santa Barbara

PAPERS:

Concept Formation in Adults: An Exploration of a Technique and Task Under Varying Conditions of Instructions and Informative Feedback

DOROTHY L. JONES, University of Wisconsin (Chester W. Harris)

The paper reports a technique and associated task (together with empirical results involved in the refinement of said task) which were developed specifically for use in a planned factor analytic study of concept formation in the adult.

The procedure originated as an attempt to parallel the formal acquistion of concepts as occurs in the school situation but permitting the sampling, externalizing and quantitative measuring of adult behavior at successive stages of practice without resort to introspection. Both deduction and induction play important roles in the evaluation of the concept.

The task itself is card sorting (verbal), but differs from others in type of cue S employs in his categorizing behavior. Each card presents a proposition which is essentially (and objectively) a unity, S's judgment of which at various stages of practice is dependent on both the deductive and inductive phases. The empirical analysis compares the profiles of groups subjected to the task under varying conditions (instructions x informative feedback) over successive stages of practice.

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The Effects of Teacher Feedback and Negative Instances on Eighth Graders' Learning of Programed Transformational Grammar

JAMES G. RAMSAY, WAYNE C. FREDRICK, HERBERT J. KLAUSMEIER, and NATHAN S. BLOUNT, University of Wisconsin

A set of lessons with a programed learning format, designed to teach concepts of transformational grammar, was used as experimental material. The experiment was a 2x3x2x2 factorial design; the factors were sex, three levels of IQ, two levels each of teacher feedback and negative instances. Forty-eight *S*s were assigned to four treatment groups. *S*s received daily tests and a posttest.

The analysis of variance of the posttest scores indicated that IQ was highly significant ($p < .01$), with better scores associated with higher IQ ranges. Females scored higher than males ($p < .05$). *S*s receiving teacher feedback scored higher ($p < .01$) than those *S*s who did not receive feedback. There was no significant difference between *S*s receiving 1/4 negative instances and those who received all positive instances. A significant IQ x Teacher interaction ($p < .01$) indicated that the performance of the high IQ *S*s was differentially facilitated by the teacher variable. Results of the daily tests supported the posttest findings.

The results suggest that the learning of this programed material can be facilitated through direct teacher feedback. IQ level was positively related to performance; of more practical significance is the finding that *S*s in the low IQ range did not profit from teacher feedback as much as the *S*s in the high IQ range did. The findings also show a correspondence between concept learning in the laboratory setting and the school setting. In both cases it has been found that negative instances do not facilitate the initial learning of conjunctive concepts.

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Concept Formation as a Function of Sequence of Presentation and Ratio of Positive to Negative Instances

NANCY SIDON SMUCKLER, University of California, Los Angeles, and
J. KENT DAVIS, University of Wisconsin (H. Klausmeier)

As part of a comprehensive program in conceptual behavior at the R & D Center, University of Wisconsin, this experiment investigated applicability to concept formation of principles derived from concept identification studies. The independent variables for the concept formation task were: (1) stimuli presentation sequence (simultaneous vs. successive, (2) ratio of positive to negative instances (100, 75, 50, and 25 per cent positive).

Subjects, 90 second graders, were randomly assigned to one of eight treatment groups or the control and presented with 40 labelled geometric figures by means of slides. Trapezoids (labelled TRAPEZOID) were designated positive instances; all other figures (labelled NO) were designated negative. At eight-figure intervals throughout training subjects were tested on new unlabelled figures. To test for transfer and retention, subjects were requested to circle trapezoids in a booklet containing 30 novel instances.

Analyses of variance were performed on number of correct responses, the dependent variable for each phase. Results show a superiority of successive over simultaneous presentation ($p < .05$) in the concept acquisition phase. Also, the 50, 75, and 100 per cent positive instance groups displayed superior performance over the 25 per cent group ($p < .01$) indicating the need for employing at least 50 per cent positive instances for effective concept acquisition. In the transfer phase, the 100 per cent groups performed significantly better than either the 25 or 75 per cent groups ($p < .05$), indicating the utility of employing 100 per cent positive instances during acquisition in order to facilitate transfer. From these findings it was demonstrated that the unequivocal application of concept identification principles to the area of concept formation is not justified.

9:00 to 9:50 A.M. SESSION 160 DIVISION D

Joint Session with National Council on Measurement in Education

TEST DEVELOPMENT IN THE AFFECTIVE DOMAIN

CHAIRMAN:

Julius M. Sassenrath, University of California, Davis

PAPERS:

A Factorial Description of the Junior Index of Motivation

PHILIP M. CLARK and JACK R. FRYMIER,
Ohio State University

Since the Junior Index of Motivation was developed as a broad measure of desire to perform effectively in school, and since other studies had suggested its factorial complexity, a factor analysis of its 50 scored items was undertaken in an effort to improve understanding of its content. The tests of 98 male and 98 female subjects were randomly selected from among some 500 such tests which had been completed by a highly representative sample of American high school seniors. Responses to the scored items were intercorrelated, the resulting matrix was factored by the principal axes method, and this solution was rotated to orthogonal simple structure according to Kaiser's Varimax technique. Fifteen factors emerged, the five largest of which included the highest factor loading for each of 26 of the 50 scored items. The dimensions represented by these factors were named, in descending order of amount of common variance accounted for: (1) Belongingness-Alienation, (2) Positive-Negative School Attitude, (3) Personal Control-Fatalism, (4) Optimism-Pessimism, and (5) Flexibility-Dogmatism. These five largest factors were found to bear some resemblance to factors which had been formerly predicted on an *a priori* basis and which had been suggested by the results of previous studies.

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A Validation Study of an Adjusted TASC Score

LAWRENCE WIGHTMAN, ROBERT P. O'REILLY, and RICHARD E. RIPPLE,
Cornell University

This study gathered construct validation data for an adjusted score based on the *Test Anxiety Scale for Children* (TASC) and the *Lie Scale* for Children (LSC). The data came from four sources: (1) teacher rankings of anxiety, (2) correlations with achievement and intelligence, (3) pre-test/post-test correlations, and (4) correlations with creativity scores.

A total of 165 sixth graders received ten periods of instruction from a linear program. Subjects were pre-tested on anxiety, intelligence (verbal), verbal creativity, and achievement on the material taught in the program. After instruction, *S*s were readministered the tests of anxiety, creativity, and achievement. The LSC scores were adjusted to have the same variance as the TASC scores and the two were summed to obtain the TASC(adj.) scores. Teachers ranked their students on anxiety after a week of guided observation.

The reported data are, in the opinion of the authors, sufficient justification for selecting the TASC(adj.) score as a more valid measure of anxiety than the TASC score.

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The Internal Structure of the SVIB

Larry L. Havlicek,
Mid-Continent Regional Educational Laboratory, Kansas City, Missouri

The intercorrelations among scores on instruments such as the MMPI and the SVIB are influenced by items which are weighted for more than one scale, making the scores mutually dependent. On such instruments, the correlation between scores for any sample may be illusory or spurious due to this overlapping. The purpose of this study was to determine the correlation between the weights for all 1,378 pairs of the 53 occupational scales. Such information provides an estimate of the extent observed relationships can be accounted for on the basis of overlapping items and, as Strong pointed out, would give the relationship between the criterion groups. Using the 1965 revision, the computed correlations range from –.47 to +.66, and 973 or 71% are significantly different from zero at the .01 level. The results are similar to a previous study on the 1938 SVIB, and demonstrate that the scales are empirically interrelated and are not independent. On the assumption that these correlations represent a valid indication of the degree of relationship between scales, a reclassification of Strong's families of occupations is presented.

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The Validity and Homogeneity of the Minnesota Teacher Attitude Inventory

Albert H. Yee, University of Oregon

The MTAI has been employed more often in studies of teachers' attitudes than any other instrument. Although most studies support the MTAI's use, some researchers have questioned its validity and susceptibility to faking. Thus, its extensive use has continued with uncertainty concerning its worth. Getzels and Jackson concluded their 14-paged Handbook review of the MTAI by saying any efforts are justified to make the MTAI more meaningful.

This writer's study of teacher-pupil attitudes provided 212 teachers' and their 52 principals' MTAI responses with c. 6,000 pupils' ratings measured by the 100-itemed "About My Teacher" inventory. Principals' ratings of teachers were also obtained. Statistical item analyses of the MTAI were conducted using pupils' and principals' ratings as criterion measures. Using pupil scores, results show few items discriminate between the top 27% and bottom 27%

groups of teachers. First analyses using principals' ratings provide more positive results. Rather than rapport with pupils, MTAI score may better indicate principals' satisfaction with teacher.

To supplement favorable split-half reliability estimates, another measure of homogeneity is being computed with total MTAI score as criterion. With 368 teachers' MTAI responses, the first factor analysis (principal axis rotated by Varimax) of all 150 items together was successfully run. The 46 factors extracted suggest the MTAI is quite heterogeneous. The significant factors should provide more homogeneous, unidimensional measures of teachers' attitudes.

9:00 to 9:50 A.M. **SESSION 161** **DIVISION C**

CHARACTERISTICS OF TEACHERS

CHAIRMAN:

Madeline H. Apt, Miami University

PAPERS:

Educational Attitudes and Perceptions of Desirable Traits in Teachers

Fred Kerlinger and Elazar Pedhazur,
New York University

How do attitudes toward education affect perceptions of desirable traits of teachers? To answer this and related questions, directive-state theory, which says that motives, attitudes, values and other central states influence perceptions, was invoked. In this research, progressive and traditional attitudes toward education were the central states that were assumed to influence teacher trait perceptions.

An earlier study used *Q* methodology to test the hypothesis. The present study used *R* methodology: three summated-rating attitude scales and two summated-rating and two "situational" perceived traits measures were administered to teachers and graduate students of education in New York, North Carolina, Texas, Wisconsin, Indiana, and Michigan (total $N > 3{,}000$).

The results supported the hypothesis. The correlations between the progressive and the traditional attitudes (two relatively orthogonal factors) and two factors of trait perceptions were positive and statistically significant, though modest in magnitude. In choosing between two kinds of teacher descriptions ("situational" scales), teachers with progressive and traditional attitudes chose trait descriptions (person orientation and task orientation) congruent with their attitudes. Although the two attitude and the two perceptions item factor types were factorially discriminable, second-order factor analysis showed that the progressive attitude and person-orientation perception factors clustered together, and the traditional attitude and task-orientation perception factors clustered together.

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Personal versus Stereotypic Views of Teachers' Career Orientations

Edward A. Nelsen and John Giebink, University of Wisconsin

Education students ranked a set of factors according to importance in influencing personal career choice. *S*s also ranked the factors according to importance in influencing career choice of *others* who select teaching as a career, and according to the social desirability ("goodness" or "badness") of the factors. Opportunities for intellectual stimulation, autonomy, and to help others were rated as most important positive considerations, lack of stimulation, lack of advancement opportunities, and lack of contact with others, most important negative considerations. Comparison of the rankings for "self" versus "others" revealed that teachers rated opportunities for intellectual stimulation and autonomy as significantly more important for themselves than for others. Career choices of other teachers were seen comparatively as more influenced by desire for good pay, security, and availability of jobs. Motives ranked as more important for oneself were also ranked as more socially desirable; those more important for others, less desirable. The results were interpreted in terms of projection, stereotypy, and response-set. These interpretations were further evaluated through assessment of individual differences in a follow-up study. Three sets of discrepancy scores were derived: difference between self and other D-SO, between self and "desirable" D-SD, and between other and "desirable" D-OD. D-SO and D-SD were both negatively related to Authoritarianism (California F Scale). D-SD was also related negatively to the MMPI Lie Scale. A response set interpretation appears to receive the greatest support.

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Relationships Between Field Independence, Dogmatism, Teacher Characteristics and Teaching Behavior of Pre-Service Teachers

FRED W. OHNMACHT, University of Georgia

Three studies are discussed which explore the relationship of two cognitive styles with anticipated and actual teaching behavior.

Study One: 57 *S*s were administered the Teacher Characteristics Schedule (TCS), Dogmatism Scale (D), California F Scale (F), Embedded Figures Test (EFT) and the Closure Flexibility Test (CFT). Scores were correlated and subjected to a principal components analysis and varimax rotation. Dimensions representing Field Independence and Dogmatism were independent of each other as well as of dimensions representing anticipated teaching style. Field Independence and Dogmatism were explored as possible moderator variables. Field dependent–closed minded *S*s were significantly different from other *S*s on the Zco scale of the TCS.

Study Two: A sample of 70 *S*s was employed in a replication of the first study. The factor structure was essentially invariant and the hypothesis that field dependent–closed minded *S*s would score lower on the scale predicting surgent classroom behavior (Zco) was confirmed.

Study Three: This study extended the data network to include data derived from Flanders Interaction Analysis. Neither the EFT or the D Scale was significantly related to measures derived from Interaction Analysis. Several measures from the TCS were significantly related to interaction indices with sex of the teacher exhibiting a marked moderating effect.

Personality and Characteristics of Innovative Physics Teachers

Wayne W. Welch and Herbert J. Walberg, Harvard University

From a national sample of physics teachers who volunteered to employ new instructional media, thirty-six males were selected from 17 states to attend a six-week briefing session. To characterize these teachers, a battery of four tests was administered: the Edwards PPS, the AVL Study of Values, the Minnesota MTAI, and a locally-constructed achievement test. Compared to norms for male teachers as reported in the test manuals, they were significantly ($p < .05$ for all results) higher on theoretical and aesthetic values and lower on economic, political, and religious values. They were also higher than corresponding norms on the need for autonomy and much higher on achievement than physics teachers attending three NSF Institutes. Their comparative personality profile resembles that of creative scientists. Also, within this rather homogeneous sample, teaching attitudes, as measured by the MTAI, correlated moderately (.4 to .6) with social values, the need for change, and knowledge of physics. Intraception correlated negatively and moderately (−.4) with knowledge of physics and the need for change. Apparently, those who know their subject best have more positive teaching attitudes, higher social drives, and more openness to new ideas.

9:00 to 9:50 A.M. **SESSION 162** **DIVISION C**

READING INTERESTS AND TREATMENT OF DISABLED READERS

CHAIRMAN:

Carl Personke, University of Texas

PAPERS:

Parent Training and Reading Gains of Elementary School Children

Gabriel M. Della-Piana, Robert F. Stahman, and John E. Allen,
University of Utah

The following hypotheses were tested: Pupils whose parents were involved in a training program will show greater regressed gains than pupils with parents not in training, in (1) oral reading accuracy, (2) oral reading comprehension, (3) oral reading rate, (4) silent reading vocabulary, (5) silent reading comprehension, (6) total silent reading.

All Ss were remedial students in grades three to six receiving reading instruction in groups of two to five. Forty Ss randomly assigned to experimental and control groups were reduced to 13 experimentals and 16 controls due to moving and nonattendance. Alternate forms of the *California Reading Test* (Silent) and *Gilmore Oral Reading Test* were administered in early September and late January. Parents of experimentals attended fourteen once-a-week training sessions and two individual sessions. Hypotheses (1) and (2) were supported at the .05 and .02 level respectively. The treatment accounted for 16 per cent of the variance in oral reading accuracy and 25 per cent of the variance in oral reading comprehension.

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Reading Group Placement: Its Influence on Enjoyment of Reading and Perception of Self as a Reader

Anne Lasswell, Oregon State University

Does level of reading group placement influence primary-grade students' enjoyment of reading?

Are students in the primary grades aware of the level of their group placement in reading?

Answers to these questions were sought through the exploration of 72 primary-grade childrens' perceptions of the level of their reading group placement in relation to actual group placement and extent of self-reported enjoyment of reading. Children's perceptions were obtained through structured interviews conducted by the investigator during the fourth week of school. Information about actual level of reading group placement was obtained from classroom teachers. Obtained data were analyzed employing chi square as the test of significance.

Results indicated that (1) reported enjoyment of reading at the beginning of the school year is independent of placement in high, middle, or low reading ability groups at the first and second grade levels. However for grade three, a significant relationship between the two variables was found, with members of the high group reporting much greater enjoyment of reading than average and low group members; (2) accuracy of perception of reading group placement (agreement between perceived and actual group placement) is significantly related to group placement. Seventy-two per cent of all high reading group members perceived themselves as being members of the high group while less than 20 per cent of the middle and low reading group members correctly perceived their actual placement.

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A Comparison of White and Negro Ninth Grade Students' Reading Interests

Arthur V. Olson and **Carl L. Rosen**, University of Georgia

The purpose of this study was to determine the reading interests of white and Negro students at the ninth-grade level in a recently integrated school. The investigators assumed that there would be no difference in the reading interests of the two groups of students.

The population was composed of 124 white students and 140 Negro students from an integrated school system in the southeastern part of the United States. The mean IQ of the white students was 99.09 with SD of 14.70; chronological age was 177.95 months, SD of 7.69. The Negro students had a mean IQ of 94.56 with SD of 12.89; chronological age was 175.23 months, SD of 5.62.

A reading interest inventory of 40 items with six possible ratings for each item describing their degree of interest was administered to all the students. Eighteen of the 40 items showed a significant difference (.01 level) between the responses of the white and Negro students.

The results of the study seem to indicate that there are many similarities in the interests of white and Negro students. There are, however, some differences. The findings of this study should have particular relevance to adjusting curricular materials to the needs of students of newly integrated schools.

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An Evaluation of the Inductive and Deductive Group Approaches to Teaching Selected Word Analysis Generalizations to Disabled Readers in Eighth and Ninth Grade

Lou E. Burmeister, The University of Wisconsin

A 14-level stratified-random sample of the Thorndike and Lorge *Teacher's Word Book of 30,000 Words* was utilized to determine utility levels of selected phonics and structural analysis generalizations and to arrive inductively at others appropriate for disabled eighth and ninth grade readers. Criteria used in the selection of twelve generalizations was need of the students to be taught and a 90% utility level.

The two-week instructional plans were written, one following an inductive and the other a deductive approach. A "posttest-only control group design" was used, with intact classes assigned to method at random. Each of ten teachers had three classes involved: one assigned to each approach and one to a control. Scores for nine randomly selected disabled readers within each class composed the sample; class means were used in all analyses. Delayed, unannounced posttests were given three weeks after completion of the teaching.

A one-way analysis of variance of the oral posttest data showed that there were differences among the groups, significant at the .01 level. The Scheffé indicated that the two experimental groups, together, differed from the control. The total mean for the deductive group was superior to that of the inductive group.

9:00 to 9:50 A.M. **SESSION 163** **DIVISION E**

STUDIES OF STUDENT COUNSELING PROGRAMS

CHAIRMAN:

John M. Duggan, College Entrance Examination Board

PAPERS:

An Experimental Study of the Relationship Between Perceived Evaluation of Self by Others, Evaluation of Self and of Others

CHARLES G. GALLOWAY, University of Victoria
(Geoffrey Mason)

The basic hypotheses in this experimental study were: (a) that one comes to evaluate himself and others in direct relation to his perceptions about how he is evaluated by others; and (b) that one tends to generalize his evaluations of self and others from specific to related aspects of self and others.

Thirty-two groups (16 male, 16 female) were used. Eighteen- and ninteen-year-old junior college students met in groups of five or six in a discussion-type setting (after the Zander-Cohen model) in which some experienced support and others lack of support by the rest of the group. After receipt of this differential treatment, the group members were asked to evaluate themselves and others. Comparisons were made between those persons receiving positive and those receiving negative feedback about themselves. Comparisons were also made for sex and birth order effects in a three-way analysis of variance design with power in excess of .80. Results supported the hypotheses (.001) with the exception that no effects were found to be associated with sex or ordinal position.

Dissonance, self-esteem and reinforcement theory are compared for their relative ability to make precise predictions. Consideration is given to implications of the findings for teachers and parents.

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Densensitization of College Students with Test-Taking Anxiety

ERNEST SPAIGHTS, University of Wisconsin–Milwaukee

This study sought to determine the effect of systematic desensitization in increasing students' (1) grade point averages (GPA), (2) scores on a course final examination, (3) attitudes toward test-taking, (4) scores on the Personal Adjustment sub-test of the California Test of Personality (CTP), and (5) scores on the IPAT Anxiety Scale (AS). By use of student written reports, 70 students were selected who indicated that test-taking was of great concern to them. The 70 students were assigned to two groups, experimental and control. Four college instructors employed systematic densensitization in the taking of tests for the experimental group. After each of five desensitization sessions, a counseling session was held with each member of the experimental group over a period of one semester. The results of the study indicated that students of the experimental group had significantly higher scores on the final examination (.01); significantly higher grade point averages (.01); evidenced less general anxiety (.01); evidenced more favorable attitudes toward testing than did students of the control group. No difference in mean gain scores was found between students on the Personal Adjustment sub-test of the California Test of Personality.

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Encouraging Students to Utilize Their Unscheduled Time More Effectively Through Reinforcement and Model Counseling

JAMES E. SMITH, Nova Schools, Fort Lauderdale, Florida
(William W. Turnbull)

This experimental study was designed to determine if students in schools with flexible scheduling can be encouraged to spend a higher percentage of their unscheduled time in school areas appropriate for schoolwork-oriented activities. In flexibly scheduled schools, each student is scheduled into regular classes for 65 to 75 per cent of his school day. During the unscheduled time he can attend several school-oriented areas or go to the school cafeteria.

The behavioral approach to counseling suggested these major hypotheses: (I) Students who participated in (1) teacher verbal reinforcement, (2) tape model and (3) a combination of these sessions would spend a higher percentage of unscheduled time in schoolwork-oriented areas than students not participating. (II) Students who participated in the combination sessions would spend a higher percentage of unscheduled time in schoolwork-oriented areas than students participating in teacher verbal reinforcement or tape model sessions. (III) Students who participated in teacher verbal reinforcement sessions would spend a higher percentage of unscheduled time in schoolwork-oriented areas than would students participating in tape model sessions.

The results indicate that (1) Students can be counseled to determine the general form of behavior they wish to achieve and such behavior can be stated in observable terms; (2) School officials can state their desired behavioral goals for students in observable terms; (3) Students can be assisted to make decisions that will enable them to approach or meet their goals; (4) Teachers can be taught how to employ decision-making and behavioral learning theory; (5) Reinforcing, symbolic modeling, and a combination of reinforcing and symbolic modeling of desired student behavior are effective teaching procedures.

Simulated Situation Problem Solving Tasks to Increase Decision-Making of Community College Youth

T. ANTOINETTE RYAN, Oregon State University

Finding ways to develop students' decision-making and critical thinking abilities concerns teachers, administrators and counselors. There is consensus that need for non-college bound students to develop and implement realistic decision-making is critical. The purpose of a study conducted in a community college setting was to test effectiveness of an integrated instructional-counseling program for improving realistic vocational decision-making of students with inadequate or unrealistic vocational decisions.

Approximately 250 Ss with inadequate or unrealistic vocational goals made up the sample. All Ss were given the same instructional treatment, consisting of psychology laboratory to provide Ss with information about themselves and the world of work. Ss were assigned randomly to three counseling conditions: (1) experimental, Ss met weekly in group counseling sessions involving simulated situation problem solving tasks (Ryan, 1964, 1965). During session counselor gave cues and reinforced problem solving, decision-making responses. (2) placebo. Ss met with counselor to discuss occupational planning. Problem solving tasks and counselor reinforcement were withheld. (3) inactive control. Ss not assigned to experimental or placebo conditions.

Decision-making test was administered following treatment. Analysis of data revealed that experimental Ss who had practice with simulated situation problem solving tasks under reinforcement scored significantly higher than control Ss.

10:00 to 10:50 A.M. **SESSION 172** **DIVISION B**

CURRICULUM DEVELOPMENT

CHAIRMAN:

W. James Popham, University of California, Los Angeles

PAPERS:

A Cluster Approach of Curriculum Development in Vocational Education

HAROLD F. RAHMLOW, Washington State University

The purpose of this study was to identify tasks, knowledges, and competencies common to major occupations in which non-college youth are likely to be employed. Occupations studied include office, distributive, building trades, electronics, food service, child care, and agriculture.

The questionnaires to gather task data were developed cooperatively by university and state department of education personnel working with employers and employees. A random sample of workers based upon the latest census data was drawn. Responses were analyzed using frequency counts, proportions, and factor analytic techniques. Thus, clusters of tasks common to a variety of areas of work and tasks unique to single areas were found.

Typical employees were interviewed along with experts in vocational education, science, mathematics, and communications. They worked as panels to identify clusters of knowledges and competencies associated with performance of clusters of tasks.

This study produced up-to-date information on clusters of major tasks in modern occupations and clusters of knowledges and competencies necessary for the performance of those tasks. The procedure followed can be applied in other areas and can be reapplied to keep the information current.

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Individualized Instruction Through a New Model for Curriculum Development

EDWARD J. EATON, University of Texas

The Project for Individualized Instruction, an activity of the Research and Development Center in Teacher Education at the University of Texas, has focused attention upon two required prerequisites for individualized instruction. First, there is need for facilitating organization; and second, there is need for a new model for curriculum development.

In relationship to the latter need, a new model was developed to provide students with the opportunity of pursuing a study through an approach dictated by their own interests and learning styles, and variances in rate of learning. In addition the model (1) provides for non-gradedness, (2) provides for greater breadth of subject and depth of pursuit, and (3) provides for new patterns in the utilization of teacher strengths and interests.

The Search for Comparisons in the Evaluation of a Curriculum Development Project

BURTON L. GROVER and MARVIN SCHRADER,
Manitowoc Public Schools, Wisconsin

Evaluation of new educational programs requires research decisions even though the primary goals of such programs are not research but rather development, implementation, or innovation. Adequate evaluation will basically depend upon how independent and dependent variables are classified and compared; neither the decisions about classifications nor about the comparisons are immediately obvious in field settings.

A three-year development project in Wisconsin, involving approximately 20 school systems, exemplifies these problems in evaluation. This project's evaluation plan took an approach which may be of use to several Title I and Title III programs. In order to make a naturally non-symmetric situation more manageable in analysis, certain factors which are not normally considered nested were treated as if nested; the analysis then proceeded directly to a set of orthogonal planned comparisons among meaningful groupings of cell means rather than first to analysis by a standard ANOVA table.

The evaluation analysis will be repeated for different dependent variables, which are conceptualized as several steps in a flow-chart going from the direct output of the curriculum center (written materials) to changes in teacher behavior, to the eventual hoped-for effects on pupil learning.

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One Model for Disseminating Curriculum Innovations: Processes, Problems, and Possibilities

HILDA TABA, San Francisco State College

The mounting avalanche of curriculum innovations and the increasing variety in the degrees of departure from the traditional approach they represent require some experimentation with new models of dissemination as well as a critical analysis of current models. The following questions are in order: (1) What is the congruency between the nature of innovation and the method used to disseminate it? (2) What are the consequences of the lack of congruency?

The report proposed here concerns a model of dissemination adapted to a type of curriculum innovation. In order words, it is a teaching system rather than an ordinary curriculum. A significant feature of the dissemination is an "each one teach one" model.

The questions with such a model are: (1) What implications for the methods and strategies of dissemination do such innovations have? (e.g., does distributing the printed accounts of the system suffice? Does it involve training and, if so, what kind, how expensive, with what kinds of materials? Can it be done without pricing the innovation out of the market?) (2) Is it possible to establish an "each one teach one" chain of internal dissemination?

10:00 to 10:50 A.M. **SESSION 173** **DIVISION B**

HEAD START

CHAIRMAN:

Joseph L. Mazur, Cleveland Public Schools, Ohio

PAPERS:

An Evaluation of An Eight-Week Head Start Program

MICHAEL D. BERZONSKY*, Pennsylvania Department of Public Instruction, and PHILIP REIDFORD, University of Toronto

The national enthusiasm and optimism for eight-week summer Headstart programs has little support in the experimental literature. The majority of the research studies which report measurable progress in culturally disadvantaged preschoolers after preschool exposure, base their findings on more long-term efforts than eight weeks; viz., Deutsch, Hartman, Werkhart.

This experiment studies the effect of an eight-week Headstart program on five-year-old disadvantaged children. Since there is a general consensus that disadvantaged children suffer from language deprivation (Bereiter, Bernstein, Deutsch, Ryckman, etc.), the curriculum contained fifteen minutes of language instruction a day based on the Bereiter-Engelman Program as well as the visual child-development activities described by the Home Economics Department at Pennsylvania State University.

The experimental group consisted of ten classes of children (total N = 187) selected according to Project Headstart criteria. A control group (N = 20) was also identified according to Headstart criteria. The ten experimental classes were subdivided according to the teacher's informal performance ratings. Each subgroup received fifteen minutes of the Bereiter-Engelman language instruction daily. Certain subjects were pre-tested on the Peabody Picture Vocabulary Test. An attempt was made to post-test all of these same Ss on the PPVT. In order to assess the language ability of the subjects, two subtests of the Illinois Test of Psycholinguistic Ability (Auditory Vocal Automatic, Auditory Vocal Association) were also given. Results are reported.

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Comparison of School Readiness in Children Who Attended Head Start, Kindergarten, and Post-Kindergarten Programs

MILLY COWLES, University of Georgia,
KATHRYN B. DANIEL, University of South Carolina,
VIRGINIA D. HORNS, University of Alabama (University), and
MARIE SAINZ, Newark State College, New Jersey

The purpose of the investigation was to determine what differences, if any, existed in school readiness (as measured by the *Metropolitan Readiness Tests*, Form A) among children who had attended: (1) Head Start (pre-kindergarten) and kindergarten; (2) Head Start, kindergarten, and Threshold (post-kindergarten summer program); (3) Kindergarten and Threshold; and (4) Kindergarten.

There were thirty children who were randomly selected for inclusion in each of the four groups. Tests were administered in May and September to the subjects. The specific areas of school readiness considered were "word meaning," "listening," "matching," "alphabet," "numbers," "copying." Analysis of variance technique was used to analyze the data. Results are reported.

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The Effects of Head Start Activities upon the Oral Language of First Grade Pupils

Douglas E. Giles,
San Altos Elementary School, Lemon Grove, California, and
A. A. **Daniel**, North Texas State University, Denton

This study was a comparison of the oral language development of a group of Head Start participants with a comparable group of non-Head Start participants. The study was financed by the U.S. Office of Education, and included 104 subjects. The enhancement of oral language development for disadvantaged children is a major objective of Head Start activities. This study attempted to evaluate attainment of this objective by comparing the two groups on twenty language variables. Transcribed oral interviews comprised the data.

Findings indicate that first grade pupils experiencing Head Start activities did display greater development in six aspects of oral language than first grade pupils not experiencing such activities. Pupils having these experiences were more advanced in the length of sentences, use of words from the advanced vocabulary lists, use of the noun-linking verb-noun sentence pattern, use of partial sentences, use of expressions of tentativeness, and use of vivid and colorful expressions. Significant differences were found to favor project boys and girls on the same number of variables. However, these activities were found to be more effective in encouraging the oral language development of low intelligence pupils than high intelligence pupils.

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Field Test of an Academically Oriented Preschool Curriculum

Philip Reidford, University of Toronto, and
Michael Berzonsky, Pennsylvania Department of Public Instruction

Since the advent of Project Head Start in 1965, numerous experiments have been carried out with the objective of designing a curriculum which would compensate for the environmental deficiencies of disadvantaged preschool children.

The most highly structured of these curricula is the Bereiter-Engelmann program (reported at A.E.R.A. Chicago, 1965) which teaches language, reading and arithmetic to four-year-old disadvantaged children. According to the authors, after three months of instruction, 15 disadvantaged preschoolers showed significant gain scores on three subtests of the I.T.P.A., Auditory Vocal Automatic, Auditory Vocal Association, and Vocal Encoding. Three months later Bereiter reported additional gains on the I.P.T.A. subtests, and a significant mean IQ gain on the Stanford-Binet. The Bereiter-Engelmann study was undertaken in a university where strict control of teachers and instructional content was possible.

The present experiment tested the Bereiter-Engelmann program in a public school setting where such tight control is impossible.

Two classes each of 24 children selected on Project Head Start criteria were instructed in Bereiter and Engelmann language, arithmetic, and reading curriculum for a period of six months. A gain of 6.4 was recorded on Stanford-Binet pre-posttests significant at the .01 level. As yet the data from the three I.T.P.A. subtests have not been analyzed. As well as significant gain scores on objective tests, interesting observations on teacher, parents and pupil opinion and behavior were also recorded.

10:00 to 10:50 A.M. **SESSION 174** **DIVISION C**

MATHEMATICS LEARNING

CHAIRMAN:

Gerald T. Kowitz, University of Oklahoma

PAPERS:

Sequencing and the Expository Presentation of What Is Learned in Mathematical Discovery

William G. Roughead, North Georgia College, and
Joseph M. Scandura, University of Pennsylvania

An experiment was conducted to provide evidence on an analysis by Scandura of learning by exposition and discovery. Experiments by Gagne and Brown and by Eldredge were also considered in the formulation of hypotheses.

The effects of presentation order of rules and guidance, together with effects of expository and discovery programs on immediate transfer ability, were investigated. The stimuli were finite arithmetic series and the responses were algebraic formulas for finding the sum of the first n terms in the pattern presented.

Expository, guided discovery, and discovery with hints specific to the respective rule response programs for teaching a derivation principle, were prepared and were presented either before or after frames of a rule program. The four test items were selected on a rational, rather than random, basis to insure desired relationships between the transfer measures and the scope of the derivation principle. The experimental evidence obtained was in accord with the hypotheses: (1) presentation order was critical when the guidance provided was specific to the respective formulas being sought rather than to a general strategy (derivation principle), (2) presentation order was not critical when *S*s learned derivation principles either by exposition or guided discovery, (3) what was learned during guided discovery was presented by exposition with equivalent results.

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Rule Generality and Consistency in Mathematics Learning

Joseph M. Scandura and John Durnin*, University of Pennsylvania,
Ernest Woodward and Frank Lee, Florida State University

Two experiments were conducted. In experiment one, 51 college *S*s were taught one of three rules, of varying generality, for winning the game of NIM. Two additional groups of 17 *S*s each served as controls. In experiment two, the variables were rule generality (3 levels) and example (given–not given). The materials, based on arithmetic series, were presented to 114 junior high school *S*s. All *S*s were tested on three problems, the first within the scope of each rule, the second within the scope of the two more general rules, and the third only within the scope of the most general rule.

The results generally justify the categorization of verbally presented rules as to generality. There was positive transfer to an outside scope problem in only one case and each group's performance was at essentially the same level on the within scope problems. In experiment one, the most specific rule was better learned than the others; a similar, but weaker, effect was noted in experiment two.

A third facet of the study dealt with response consistency. Except for one case where the effect was rather directly attributable to prior learning, those *S*s who used the rule taught on one problem tended also to use it on succeeding problems whether or not the rule was appropriate.

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Algorithm Learning and Problem Solving

JOSEPH M. SCANDURA and ROBERT MCGEE*, University of Pennsylvania

Four groups of 21 *S*s were presented with an algorithm (A) and tested on routine (R), generalization (RG), and novel (N) problems. The A *S*s had no prior training; the SA *S*s were presented with information (level S) deemed necessary for learning the R algorithm; the SCA *S*s also were presented with information (level C) deemed useful in modifying the R algorithm (so as to solve the RG and N problems); the SCPA *S*s, in addition, had the problems defined and were presented with relationships between an illustrative R problem and its solution (level P). The SA *S*s performed better than the A *S*s on the R and RG problems; there were no other significant increases due to amount of information presented. Only the SA-SCA RG difference resulted in a t greater than 1. On the N problems, only the SA-SCA difference was significant, the A-SA difference was suspect. Successful problem solving did not depend on an understanding of the problem involved. Transfer was attributed to learning syntactic constraints (principles) relating the algorithm and the problem characteristics. The results also demonstrated the feasibility of predicting problem solving performance by subjectively analyzing structural relationships between the criterion and the information presented.

The results of empirical research based on the SFL (e.g., Rule Generality and Consistency in Mathematics Learning, Sequencing and the Expository Presentation of What Is Learned in Discovery Mathematics), and theoretical implications will be discussed as time permits.

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The Influence of Verbal Expositive and Mathematical Symbolic Languages Upon Student's Achievement in a Course of Descriptive Statistics

SHMUEL M. AVITAL, Ontario Institute for Studies in Education
(Leslie D. McLean)

One hundred and sixty-nine vocational school teachers were given a short summer course in descriptive statistics and basic concepts of measurement.

Almost none studied statistics before. The students were divided alphabetically into four roughly equal groups. All four were given thirteen hours of instruction, ten in statistics and three in test construction. Two groups took the course during the first half of summer school, and the other two in the last half. The same teacher taught all four groups.

The instruction of the first two groups served as a preparatory stage of the experiment. A different language for each group was used. With group I no mathematical symbols were introduced, and all computational formula were written in a verbal expositive language. In group II mathematical symbols were defined verbally, then used throughout. Logical symbols for quantifiers were not introduced, but verbal expressions were kept to a minimum. There were some slips but a detailed course outline prepared at this stage made possible a strict control of the main variable when groups III and IV took the course during the second half of summer school. With these two groups the same design was used. The final results were evaluated by a sixty-item multiple-choice test prepared by this researcher. In this test only verbal expositive language was used but care was taken to avoid formulations that would seem to require mathematical symbols.

Groups that used verbal expositive language scored higher than groups that used mathematical symbolic language. Only the difference between groups III and IV was significant at the .05 level. Internal consistency of the test was .75.

10:00 to 10:50 A.M. SESSION 175 DIVISION D

STUDIES OF LEARNING ENVIRONMENTS

CHAIRMAN:

Irvin J. Lehmann, Michigan State University

PAPERS:

Empirical Taxonomies of Four-year Colleges and Universities

JOHN A. CREAGER, American Council on Education, Washington, D.C.

Classifications of institutions of higher learning are required in a wide variety of studies of higher education. Many different sets of variables may be used to characterize institutions in terms of their similarities and differences. In addition, there are many ways of grouping institutions into classes on the basis of their profiles. This study describes the application of the hierarchical grouping model and its computer algorithm to matrices of pythagorean distances among institutions in various description spaces.

Using selected subsamples from a representative sample of 245 institutions, classifications were obtained in terms of the following description spaces: (a) 10 dichotomous Office of Education classification variables, (b) 5 Freshman Input factors (intelligence, 3 types of career aspiration, and masculinity), (c) 6 Environmental Assessment Technique Orientation factors (based on percentage of degrees granted in six areas), (d) 14 factors (5 freshman input factors, 6 EAT Orientations, size, selectivity, and affluence), (e) 27 student stimulus factors from Inventory of College Activities (ICA), (f) 36 ICA factors (28 student stimulus factors plus 8 college image factors).

The resulting classifications are compared for number and stability of the groups, and for identification of "archtypal" institutions. A high degree of stability in classification is obtained at comparable levels of the hierarchy. Those institutions appearing in different groups in different analyses are discussed in terms of their special characteristics.

Refinements of the procedure, controlling for correlations among the descriptive variables, and extensions to large groups of institutions are briefly discussed.

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An Instrument to Measure Women Students' Perceptions of Their College Environments

ALYCE M. FANSLOW, HESTER CHADDERDON, and LEROY WOLINS,
Iowa State University, Ames

Using the responses of 1,500 senior women students from 25 institutions to a trial form of the present instrument, two statistical analyses were performed. The first, a modification of the Wherry-Winer method of factor analysis, developed factors indicating individual differences in perception. The second, a cluster analysis of three intercorrelation matrices, designated environmental scales measuring institution, unit, or institution by unit interaction differences. (Institution refers to a college or university; unit refers to a college or division within the institution.) The scales were compared with the factors for similarity of the characteristic measured. Dissimilar scales appeared to measure environmental characteristics attributable to actual differences. Similar scales seemed to measure characteristics based upon the kinds of students enrolled and are marked with an asterisk in the following list. The institutional scales identified were: Nonconformity; Faculty Engendered Motivation; Intrinsic Motivation for Study; Traditional Arts-Science Education; Social Responsibility; Involvement in Campus Activities; Freedom of Expression and Activities of Students; and Faculty-Student Relationships*. Sales descriptive of unit differences were: Seminar Approach to Courses; Professional Involvement; Status of Home Economics*; and Education for Home and Family Living*. Scales measuring interaction differences were: Types of Learning; and Excellence of Faculty.

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Functions of Cross-National Item Analysis Data

Richard Wolf, University of Southern California

The paper presents data obtained in connection with the International Educational Achievement Study, Phase I: Outcomes of Mathematics Instruction. Representative samples of students from four target populations were tested in twelve countries with specially constructed mathematics achievement tests. The participating countries were Australia, Belgium, England, Finland, France, Germany, Holland, Israel, Japan, Scotland, Sweden, and the United States. The four target populations were: (1) students age 13.0-13.11 years at time of testing, (2) students in the grade where the majority of students of age 13.0-13.11 are found, (3) students in the pre-university year studying mathematics as an integral part of their course program, and (4) students in the pre-university year studying mathematics as a complementary part of their course program or not studying mathematics at all. In all, over 130,000 students were tested.

Item difficulties and discrimination indices were obtained for each item in the mathematics test in each country for each target population. Rank order correlations between countries were computed for item difficulties and for discrimination indices for each of the four target populations. The median correlation between countries for item difficulties was found to be +.78, +.81, +.68 and +.77 for each of the four target populations. The median correlation between countries for the discrimination indices was +.62, +.62, +.40, and +.41 for each of the four target populations. Items which exhibited marked fluctuation in *relative* difficulty and discriminating power are identified and discussed in relation to national differences in mathematics programs.

A Description of Medical School Environments

James M. Richards, Jr., American College Testing Program,
Lorraine M. Rand and Leonard P. Rand, Ohio University

Recently, several investigators have studied junior college and college environments. Little work has been done, however, on graduate or professional school environments. The purpose of this study, therefore, was to develop a description of medical school environments. Using several published sources, 28 characteristics of medical schools were identified. Scores on these characteristics for 100 medical schools in the United States and Canada were intercorrelated and factor analyzed.

Four factors were obtained and given titles as follows: Affluence, Size, Emphasis on Hospital Training, and Canadian vs. U.S. Admissions Policies.

For 52 U.S. medical schools in the same location as their parent university, correlations were calculated between medical school scores on the factors and several characteristics of the parent university reported by Astin. In general, Size and Affluence reflect characteristics of the parent university, but the other medical school factors are independent of university characteristics. For the same 52 medical schools, factor scores were correlated with estimates derived by Cartter of the quality of the graduate program in four biomedical sciences. The Size factor is most related to quality of graduate science education.

It appears that this study succeeded in developing a brief but fairly representative profile of medical school characteristics.

10:00 to 10:50 A.M. SESSION 178 DIVISION C

STUDENT CHARACTERISTICS AND PERFORMANCE

CHAIRMAN:

Jon Clark Marshall, University of Missouri, St. Louis

PAPERS:

Differences Between School Satisfied and Dissatisfied Adolescents in Psychological Functioning and Classroom Effectiveness

CARL AURIA, Kent State University, and
ELAINE CHAPLINE, Queens College

This investigation examined the differences in psychological functioning and classroom effectiveness between public school ninth and tenth graders who on a 60 item student opinion poll indicated high satisfaction with recent school experience and those who indicated low satisfaction. Comparisons between 28 satisfied and 26 dissatisfied girls, and between 27 satisfied and 30 dissatisfied boys were made on the following: (a) DAT, (b) New York State Scholastic Survey, (c) Marks in five subjects, (d) Mental Health Analysis, (e) Rosenzweig PFT, and (f) Teacher ratings of three classroom behaviors.

T-test and chi-square procedures were utilized in analyzing the data, and the .05 level was considered the point of significance.

Satisfied girls were significantly higher than dissatisfied girls in general adjustment and classroom learning involvement. No other significant differences were found. The greater intropunitiveness among dissatisfied girls, suggested by Getzel and Jackson (1959), was not confirmed. Satisfied boys were significantly higher than dissatisfied boys not only in general adjustment and classroom learning involvement, but in marks in English, Social Studies and Languages, and in general desirability as students as indicated by teacher ratings. Further, dissatisfied boys were significantly higher than were satisfied boys on the P-F measure of extrapunitiveness. These findings point to probable eventual usefulness in differentiating for study satisfied and dissatisfied adolescent boys and girls.

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The Relationship of Some Aggressive Characteristics to Reading Achievement in Fifth and Sixth Grade Males and Females

MARILYN BARSKY, Rutgers University (Jane B. Raph)

The purpose was to determine relationships, if any, among two measures of aggression, reading ability, and sex.

Four groups of males and females (n = 84) were screened from a total sample of 372 children by a group non-reading IQ test (SRA Test of General Ability) and a group reading test (Iowa Test of Basic Skills). The superior male and female readers were matched on the variables of chronological age, IQ, reading ability, and grade; inferior male and female readers were similarly matched, although t-tests did show that inferior female readers were reading significantly higher than inferior male readers. A fifth group ($n = 21$) of average readers with average IQs was also screened. The measures were a teacher's rating of overt aggression adapted from the Fels Revised Child Behavior Scales, and the Robert Sears Aggression Scales.

Intercorrelations yielded highly suggestive evidence of construct validity for the seven scales of both measures for the total group of 105 children and for each group separately. A 2 x 2 covariance analysis indicated that inferior male readers were significantly higher in anti-social aggression on the Fels Scale than inferior female readers, while in pro-social aggression on the Sears Scale, inferior male readers were significantly lower than inferior female readers.

Inferior male readers by analysis of variance rated themselves significantly higher in both anti-social and projected aggression on the Sears Scales than superior male readers.

Inferior readers were found significantly lower in assertion on the Fels Scale than superior readers, regardless of sex.

In aggression anxiety on the Sears Scale, sex differences only were found, the females being significantly higher than the males.

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Motivational Orientation, Risk-Taking and Persistence

MARTIN L. MAEHR, Concordia Senior College, and
RICHARD VIDEBECK*, Teachers College, Columbia University

This paper reports an experimental investigation of the relation between risk-taking tendency and task persistence under varying success-failure conditions. Subjects (107 male undergraduates) were approached in an informal manner in their dormitory rooms and asked to participate in one of two experiments. In one experiment they received immediate payment of $1.00 for their services. In the second experiment *S*s had a 1/60 chance of winning $60.00 for their services. Informed of the conditions, *S*s were given their choice of study and this choice represented one index of risk-taking tendency. Subjects were also administered the Wallach-Kogan Risk-taking questionnaire as a second index of risk-taking tendency. In order to index persistence *S*s were presented with a "psycholinguistics task" which required them to judge whether a specific English word was a cognate of a given African word. The success-failure feedback administered by *E* was contrived and varied across *S*s. After ten judgments *S* were allowed to stop if they chose, and were systematically reminded of this at various time intervals. The number of judgments made represented the persistence score. It was found that both high and low risk *S*s were more persistent at intermediate levels of success (65% correct responses) than at high (90% correct responses) or low (15% correct responses). However, this tendency was most clearly evident in the case of high risk *S*s.

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Do Driver Training Courses Produce Better Drivers? An Alternative Hypothesis

J. WILLIAM ASHER, Purdue University

Drivers who have had driver training courses in high school are better drivers. This is an established fact. However it is based on research of which the great majority is field study in nature, i.e., simple description and correlation. Few alternative hypotheses have been tested, including the possibility that those who take driver training courses are intrinsically different than those who do not.

A representative U.S. sample of 798 high school seniors was selected for study from the Project Talent Data Bank. From this sample students were selected who had taken driver training and who had not, but who had the opportunity to do so. Seventy variables covering a wide range of achievement, interest, socioeconomic, hobby, and driving variables were used.

Results: Of these, 11 variables were significantly different at the .05 level, over three times the expected number by chance alone. Five of these differences were on information variables about literature, music, social studies, mathematics, and biological science. Others were socioeconomic variables, number of semesters of foreign languages taken, and amount of education they expect in the future.

Clearly, an alternative hypothesis of intrinsically unequal groups selecting to take and not take driver training courses is quite plausible.

11:00 to 11:50 A.M. **SESSION 180** **DIVISION C**

CLASSROOM INTERACTION ANALYSIS

CHAIRMAN:

David B. Crispin, Indiana State University

PAPERS:

Imitation of Supervisors as a Factor in Teachers' Classroom Behavior

E. LELAND BRODE, Northern Illinois University, DeKalb

It was hypothesized in the present study that teachers' verbal behavior in their interactions with their students is influenced by the teachers' incidental imitation of their supervisors' verbal behavior.

The sample consisted of the faculties of six elementary and four junior high schools. Usable data were obtained from a total of 193 teachers. The data consisted of the teachers' expressed preferences for various examples of "direct" and "indirect" (as defined by Flanders) teacher responses to a series of tape-recorded classroom episodes. Prior to listening to the tapes, the teachers in each school were assigned to one of two treatment groups and in a situation which simulated certain suppervisor-teacher relationships, the experimenter discussed certain aspects of the recorded episodes — characteristics of the students, subject matter being studied, etc. With one group the experimenter's own style of verbal interaction was predominantly "direct" and with the other group predominantly "indirect."

The data from the junior high teachers did not yield statistically significant differences, but the data from the elementary teachers supported the hypothesis at the .01 level. The teachers in each treatment group expressed significantly greater preferences for classroom behavior similar to that displayed by the experimenter with the respective groups.

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The Effects of Teaching Interaction Analysis to Student Teachers and Cooperating Teachers

EDMUND JAMES AMIDON, NORMA FURST, and JOHN MICKELSON*,
Temple University

This study tested the effect of training in interaction analysis upon the behavior and attitudes of student teachers in secondary education. The study was designed to determine whether student teachers taught interaction analysis are perceived by college supervisors to be more effective, have more positive attitudes toward student teaching, and are more indirect in their teaching than student teachers not taught interaction analysis. The study determined whether student teachers working with cooperating teachers trained in interaction analysis are perceived by their pupils to have changed more during student teaching, and have more positive attitudes toward the teaching situation than student teachers working with cooperating teachers not so trained.

Forty-four secondary education student teachers were randomly assigned to experimental groups I to IV during each of three semesters. Group I and Group III learned interaction analysis, as did the cooperating teachers supervising groups I and II. The others had learning theory training.

Results of the study indicated that student teacher groups trained in interaction analysis differed significantly from those who were not. On a number of teaching role behavior measures, results of the study also indicated that the different cooperating teacher training apparently had a different effect on a student teacher's behavior. Interaction analysis trained student teachers were more indirect, accepted more pupil ideas, directed less, and had more pupil initiated talk than the other groups.

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The Effect of Training Foreign Language Student Teachers in Interaction Analysis

GERTRUDE MOSKOWITZ, Temple University

Increasing attention is being given to studying the classroom behavior of teachers, but the area of foreign language has been overlooked. The purpose of this study was to determine the effects of training foreign language student teachers in interaction analysis.

The following were examined before and after the training: (1) The teaching patterns of the student teachers, (2) The attitudes of the student teachers toward teaching, (3) The attitudes of the student teachers and their cooperating teachers toward each other, (4) The attitudes of the pupils toward learning a foreign language.

The subjects were 14 secondary foreign language student teachers who received training in the Flanders system as it related to the concepts of foreign language teaching. The data collected for the study consisted of four tape recordings made in each student teacher's class and analyzed with the Flanders system and four questionnaires used to assess attitudes.

The following were the differences found at the end of the training. The student teachers were significantly more indirect in teaching both grammar and conversation lessons and had more positive attitudes toward teaching. Their pupils perceived certain related changes in the student teachers' behavior. The attitudes of the cooperating teachers were more positive toward these student teachers.

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The Effects of Training in Interaction Analysis on the Teaching Patterns of Student Teachers in Favored and Non-Favored Classes

ANITA SIMON, Temple University

Twenty-eight secondary level student teachers of English and social studies were observed with the Flanders System of Interaction Analysis in classes which they selected as favored and non-favored to determine if these student teachers actually did vary their teaching behaviors in their different classes. With the exception of short praise statements (more used in favored classes) no significant differences were found between the teaching behaviors of student teachers in their favored and non-favored classes.

In addition, one-half of the student teachers were trained in the Flanders System of Interaction Analysis while the other half were trained in learning theory. Student teachers who learned the Flanders System used significantly more praise, less criticism, more extended indirect influence, less extended direct influence, had a higher ratio of indirect to direct influence and had a higher ratio of indirect influence immediately following student talk.

Apparently, student teachers have characteristic teaching styles which are not related to their perceptions of favored and non-favored classes. It appears that training in the Flanders System, however, is related to the classroom verbal behavior of student teachers.

One implication of this study is that efforts to affect the teaching behaviors of student teachers should focus on behavioral training rather than on attempts to place student teachers with certain kinds of pupils.

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Interaction Analysis in the Minnesota National Laboratory Mathematics Field Study

E. Muriel J. Wright, San Fernando Valley State College, California

Since 1961 the Minnesota National Laboratory, Minnesota State Department of Education, has been studying the effectiveness of new mathematics programs — SMSG, Illinois, Ball State and Maryland — in some 150 classes grades 7-12 in schools of Minnesota, the Dakotas, Iowa and Wisconsin, introduced without special teacher training.

During 1964 and again in 1965 measures of teacher-pupil interaction during instructional periods were made to assess the nature of CONTENT and of INVOLVEMENT in experimental and control classes using two category sets simultaneously, modified from systems of Wright and of Flanders.

Hypotheses were pertinent to important questions about classroom effects of new mathematics curricula. Do the experimental curricula increase attention to theoretical aspects of mathematics without neglecting practice in specific skills? Do the pupils in experimental classrooms demonstrate greater use of the mathematical method in developing new concepts or in problem solving?

A trend towards greater emphasis in experimental classes of theoretical aspects of mathematics was apparent. Further a substantial number of classes achieved this without neglect of skills. However, pupils in experimental and control classes experienced essentially the same quality and quantity of involvement. In this study introduction of new curricula without teacher training was insufficient to increase pupils' practice of mathematical method.

11:00 A.M. to 12:10 P.M. SESSION 181 DIVISION C

WORDS AND PICTURES AS LEARNING STIMULI

CHAIRMAN:

O. L. Davis Jr., University of Texas

PAPERS:

The Effect of Pictures on Learning to Read

S. JAY SAMUELS, University of Minnesota

Teachers have accepted the inclusion of pictures in readers without critically evaluating their effect on reading acquisition. Pictures may be used as prompts when the child cannot read a word in the text, but the picture may mis-cue him and may compete for his attention, diverting him from the critical task of attending to the words.

In experiment 1, thirty randomly assigned first graders learned to read the same words under a no-picture, relevant-picture, and complex-picture condition. During acquisition trials, when pictures were present for two groups, the relevant-picture and complex-picture groups made more correct responses than the no-picture group ($p < .01$). On critical test trials, when pictures were not present for any group, the no-picture group excelled ($p < .01$).

Experiment 2 had 26 matched pairs of first graders. Half of them read with a picture present, the other with no picture present. The instructional procedure was similar to that used in classrooms. Both experimental conditions were instructed simultaneously in small groups by the same teacher. The results disclosed that poor readers with no picture present learned more words ($.002 < p < .01$). Among the better readers the difference was not significant ($.10 < p < .25$).

It seems advisable to reexamine the role of pictures in terms of motivation, arousal, stimulus novelty, and attentional processes.

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Differential Memory for Picture and Word Stimuli

JOSEPH R. JENKINS and DANIEL C. NEALE, University of Minnesota, and STANLEY L. DENO, University of Delaware

Pictures and words were employed in a recognition task. The differential nature of encoding and storage of these two types of stimuli motivated the study. The design of the study was such that not only did Ss identify previously seen stimuli, i.e., see pictures . . . recognize pictures (PP) and see words . . . recognize words (WW) but also conditions were included first where Ss saw pictures and then identified words which represented the pictures (PW) and second where subjects saw words and then were asked to identify pictures (WP).

Results indicated that when the number of correct identifications of the original stimuli were compared, group PP was statistically superior to WW, $P < .001$, and that PW was virtually the same as WW but significantly superior to WP, $P < .05$.

The tendency to admit intrusions, identifying new stimuli as members of the initial series, was significantly more predominant in the WW conditions than in the PP condition, $P < .001$. PW did not differ from WW but was more effective than WP, $P < .025$. Group PP correctly identified more new stimuli than group WW, $P < .05$. The results are discussed in the context of the storage processes for pictures and words.

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Learning Language Equivalents: Effects of Words, Pictures, and Conceptual Similarity

STANLEY L. DENO, University of Delaware

The present study was an investigation into the influence of three variables on the rate at which foreign word meaning was acquired through equivalent pairing. The variables manipulated were: (1) the type of abstraction which was presented as equivalent in meaning to the foreign word (either a word or a picture), (2) the similarity among the objects to which both the familiar abstractions and the foreign words referred (either conceptually similar or not), and (3) the method of presenting abstractions which referred to conceptually similar objects (either in groups or in isolation).

Seventy-two students enrolled in introductory educational psychology classes participated individually as subjects. Each subject was required to learn a 12 pair set of either English word-Japanese word or simple picture-Japanese word equivalents which were either conceptually dissimilar, similar-isolated, or similar grouped. The pairs were presented at a controlled rate on a rear projection screen and learned under a paired-associate anticipation technique to determine the rate of acquisition.

The findings indicated that pictures and words representing familiar objects do not function as equivalent abstractions for learning the meanings of unfamiliar words. Generally, pictures facilitated the learning of equivalent pairs, especially when the objects represented by the abstractions were conceptually similar. Further, grouping of the abstractions representing conceptual similar objects increased the rate of acquisition.

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Learning Efficiency as a Function of Depiction, Verbalization, Grade and Social Class

WILLIAM D. ROHWER, JR., STEVE LYNCH, JOEL R. LEVIN, and NANCY SUZUKI, University of California, Berkeley (Leonard A. Marascuilo)

A total of 384 kindergarten, first-, third- and sixth-grade children, half of whom were drawn from middle-class areas and half from lower-class areas, were asked to learn a list of 24 paired associates. All pairs were presented pictorially by a study-test method for a total of two learning trials. The first manipulated factor, Depiction, consisted of two levels: Still, in which the two objects in each pair had been stationary when recorded on movie film; and Action, in which the two objects in each pair had been moving when photographed. The second factor, Verbalization, consisted of the experimenter either Naming aloud the two objects in each of the pairs or uttering a Sentence containing the names of the two objects in each pair. The remaining two factors were Grades and Social Class. As predicted, both action depiction and sentence verbalization produced increases in learning efficiency and older children learned more rapidly than younger ones. Quite unexpectedly, however, children from lower-class areas learned as efficiently as those from middle-class areas despite the inferior performance of the former on standardized tests.

Classification and Analysis of Instructional Illustrations with Reference to Subject Matter and Educational Objectives

MALCOLM L. FLEMING, Indiana University

Instructional illustrations, whether in textbook, programmed materials, television or other medium, were considered to be an unordered domain requiring systematic description prior to a program of research which would relate the characteristics of such pictorial stimuli to the responses of learners.

As a preliminary classification step, four taxonomies were constructed: physical attributes (eleven scales), verbal modifiers (five scales), educational objectives (five scales), and subject matter (one scale). The physical scales were intended to categorize the physical attributes of illustrations that might be determinative of learner behavior. The objective type scales recast in behavioral terms some of the categories from the Bloom taxonomy. The 25 scales were applied to a 6% stratified sample of 787 illustrations from 40 eighth grade textbooks. Chi-square analysis of the frequency distributions yielded significant associations ($p < .05$) as follows: (1) The type and level of educational objectives assigned the illustrations were significantly associated with the subject matter of the illustrations. (2) Both the physical attributes of the illustrations and the verbal modifiers of the illustrations were significantly associated with the subject matter of the illustrations. (3) Both the physical attributes of the illustrations and the verbal modifiers of the illustrations were significantly associated with the type and level of educational objectives assigned the illustrations.

12:00 to 12:50 P.M. SESSION 190 DIVISION C

STUDIES OF CULTURALLY DISADVANTAGED CHILDREN AND YOUTH

CHAIRMAN:

Roslyn M. Grady, Colorado Springs Public Schools, Colorado

PAPERS:

The Effects of an In-Residence Summer Program on the Academic-Year Performance of Underachieving Disadvantaged High-School Youth

DANIEL TANNER, The University of Wisconsin–Milwaukee, and
GENARO LACHICA, City University of New York

What are the effects of an eight-week, in-residence summer program, conducted at a university campus, on the academic-year performance of underachieving, disadvantaged high-school boys and girls?

A group of 145 boys and girls was selected at random from a population of 579 students who had just completed the ninth grade of the New York City schools. All had been classified as disadvantaged and underachieving, and all were selected for a special high-school program designed to discover and develop their college potential. The 145 students were compared with the control population for initial differences in aptitude and achievement. Following their participation in the summer program, they joined the control population in the special high-school program (conducted in five high schools). Differences among schools were treated by analysis of variance.

Although initial measures of aptitude and achievement tended to favor the control population, the summer group obtained slightly higher grades and had a lower dropout rate during the academic-year program. The initial differences were corrected in the final analysis by covariance methods. Most of the original group of 145 boys and girls participated in a second summer program in July-August, 1966. Their performance during the eleventh grade was analyzed to test the hypotheses.

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The Relationship Between Parent Behavior and Achievement of Inner City Elementary School Children

PAUL T. RANKIN, JR., Detroit Public Schools

The purpose of the study was to determine what specific kinds of parental behavior are related to the scholastic achievement of inner-city elementary children.

From 241 third- and fourth-grade children in a Detroit school were selected samples of 32 of the highest achievers and 32 of the lowest achievers on the basis of achievement relative to scholastic aptitude. The mothers of the 64 children were interviewed using an interview schedule designed to assess many kinds of parent behavior considered potentially influential on children's achievement.

Of 113 specific kinds of behavior examined, 17 showed significant differences between the parents of high achievers and those of low achievers. In every case the parents of high achievers reported more or greater frequency of the behavior. The findings supported a conclusion that scholastic achievement of such children is positively related to (1) the amount of interest taken by parents in their school activities, (2) the extent to which parents encourage their interest in reading, (3) the level of parents' aspirations for their educational attainments, (4) the extent of parental communication with school personnel, and (5) the extent to which parents share experiences with children.

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Influences on Cognitive and Motivational Conditions for Acculturation

Ronald W. Henderson, University of Oregon

A comparative study of the home environments of Mexican-American six-year-olds, for whom school success (N 38) or failure (N 42) was predicted, revealed significant differences in range of experiences available to the children and in acculturation level of their families.

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An Evaluative Study of Prekindergarten Programs for Educationally Disadvantaged Children

Louis T. Di Lorenzo, New York State Education Department, Albany

This is a longitudinal evaluation of the effects of preschool education on (1) capacity to learn, (2) social development, (3) self-concept, (4) motor development, and (5) attitudes toward school. Children ages 3½ to 4½ identified as disadvantaged on the basis of father's occupation, along with approximately 20% nondisadvantaged children, are being randomly assigned to experimental and control groups in eight school districts offering diverse preschool programs. The first children in the program (1965-66) have been followed into second grade, the second group into first grade, and the third group into kindergarten to determine academic and overall school adjustment.

All children in the 1965-66 group were pretested with the Stanford-Binet Intelligence Scale and the Peabody Picture Vocabulary Test. The Illinois Test of Psycholinguistic Abilities and a newly-developed test of self-concept were added in the posttesting. Differential analyses of the pretest results showed differences by sex, race, district, and socioeconomic status. There was a strong correspondence between father's occupational rating and IQ. Comparisons are being made of the gain scores of the total experimental and control groups on the posttesting.

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Changing School-Related Attitudes of Culturally Disadvantaged Children

Daniel C. Neale and **Bruce Mussell**, University of Minnesota

Two hundred children from elementary schools in culturally disadvantaged neighborhoods were nominated by school personnel on the basis of need for better school motivation, higher levels of aspiration, improved peer relations, and more positive self evaluations. One-half of the nominees were randomly selected and assigned to a college student volunteer. Each volunteer met with a child at least once a week for an eight-month period to engage in informal social and recreational activities. It was hypothesized that each child would identify with his college student friend and, on that basis, develop more positive attitudes toward school and raise levels of aspiration. In addition the friendship and emotional support provided by the volunteers was expected to enhance the children's concepts of themselves and improve their peer relations.

Attitudes of all children were assessed at the beginning and at the end of the project by means of interviews and a version of the *Semantic Differential.* An analysis of variance procedure indicated significantly more improvement for children in the project compared with controls in measures of self evaluation and attitudes toward peers. In addition trends toward higher occupational aspirations and more positive attitudes toward school were noted.

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Factors Associated with Under- and Over-Achievement Among Socio-Economically and Racial-Ethnically Different Elementary School Children

RUSSELL ADAMS and BEEMAN N. PHILLIPS, The University of Texas

Recent investigations indicate that under-achievement tends to have origins in the early school experiences of children; and the purpose of this study was to investigate the role of anxiety, defensive reactions to anxiety, peer status, and other variables as correlates of under- and over-achievement among fourth grade children. Using data obtained from a larger USOE-sponsored project, 571 Ss classified into middle-class Anglo, upper-lower-class Anglo, and lower-class Non Anglo (Negro and Mexican-American) subgroups were studied. To avoid the methodological shortcomings which have plagued research in this area, zero order and multiple *part* correlation coefficients were computed in accordance with recommendations of Thorndike. Among the numerous significant results that emerged, it was found that over-achievers, compared to under-achievers, were less school-anxious, had a higher level of school motivation, evidenced less serious maladaptive classroom behavior and fewer withdrawal tendencies, and were more popular among their peers. In addition, a number of statistically significant and psychologically meaningful differences between socio-cultural subgroups, and multiple part correlations, emerged.

12:00 to 12:50 P.M. SESSION 193 DIVISION C

TEACHER BEHAVIOR AND CREATIVITY OF PUPILS

CHAIRMAN:

R. J. Karraker, University of Missouri

PAPERS:

A Preliminary Analysis of an Observation Schedule Designed to Identify the Teacher-Classroom Variables Which Facilitate Pupil Creative Growth

DAVID A. DENNY, New York State University College, Oneonta

An observation schedule constructed to identify the teacher-pupil variables which are related to pupil gain on creativity measures was subjected to a preliminary analysis to obtain estimates of its objectivity, reliability and validity. Thirty sixth-grade classrooms in a midwestern state were pre-posttested using adaptations of Guilford's tests. Three randomly selected visits were made to each classroom by a team of three observers between pre- and posttesting.

Estimates of reliability and objectivity were obtained by analysis of variance procedures. Validity was estimated by comparison of posttest class means adjusted by analysis of covariance for initial IQ and pretest levels, with observation mean scores.

Item and dimension reliability ranged from .38 to .91. Coefficients of objectivity ranged from .40 to 1.00. Total schedule reliability was .42. Predictive validity was indicated in that high observation scores related positively to pupil creative gain. Hypotheses regarding construct validity were partially supported.

It was concluded that for this population and measures of creativity employed, it was possible to predict from mean observation score data on the *Denny, Rusch, Ives Classroom Observation Schedule* the classes which gained significantly on the creativity measures over the period of a school year.

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Improving Creative Problem-Solving: An Experiment

SARA W. LUNDSTEEN, University of California, Santa Barbara

The major research hypothesis of this exploratory study was that a language arts program having a high degree of emphasis on inductive development of creative problem-solving concepts would result in significantly higher achievement scores as measured by the Lundsteen tests of problem-solving than would the usual program which makes little provision for the development of thinking processes.

Volunteer classes in the third and sixth grades ($N = 355$) in Goleta, California were assigned randomly to experimental and control groups. Experimental teachers attempted to internalize and employ the teacher-learning theory developed for this study. Teachers used a pattern for conducting class discussion of certain children's books and used a coding system for analysis of taped discussions. Groups were pretested in September and then posttested after 23 weeks of instruction. As there was no significant initial difference between groups on the pretests as well as on STEP Reading and SCAT, the data were analyzed using *t* tests.

There appeared to be a difference in favor of pupils participating in the experimental language arts program at the sixth-grade level. These pupils scored significantly higher (.01 level) on the objective and open-ended problem-solving measures than did pupils in the control group.

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Teacher Characteristics, Classroom Behavior, and Growth in Pupil Creativity

Richard L. Turner, Indiana University, and
David A. Denny, New York State University College, Oneonta

Concurrent relationships among three sets of variables were examined: Set I, Teacher Characteristic Scales: Stability, Organization, Resourcefulness, Viewpoint and Involvement; Set II, ten observed teacher classroom behaviors ordered to three groups: Climate, General Structuring, and Specific Structuring for Creativity; Set III, four Guilford Creativity Scales: Fluency, Sensitivity, Flexibility, and Redefinition.

Pupils in thirty sixth-grade classrooms took the Guilford scales in October and again in April. Their teachers were observed three times during February-March using the Denny-Rusch-Ives Classroom Observation Schedule. The teacher characteristic scales were mailed to teachers after the final testing of their pupils. Relationships between teacher characteristics, classroom behavior and adjusted creativity gain were determined by correlational analysis and ANOVA.

Teacher involvement and stability were predominantly unrelated to observed teacher behaviors and pupil gain. Organization was positively related to climate ($p < .01$), and both were negatively related to fluency gain ($p < .05$). Viewpoint (permissive) was positively related to flexibility gain ($p < .01$) and to general structuring ($p < .05$), but the latter were unrelated to each other. Resourcefulness was positively related to redefinition gain ($p < .01$) and to specific structuring ($p < .05$), but the latter were unrelated to each other.

Teacher characteristics are reflected in observed teacher behavior and each, somewhat separately, in pupil gain.

Relationships Between Teacher Characteristics and Pupil Behavior — Grades One and Three

NORMAN E. WALLEN, San Francisco State College

A sample of teachers in each of grades one (N = 36) and three (N = 40) was obtained within a large urban school district. Relationships between teacher measures and class (pupil) change and status measures were studied. Several hypotheses based directly on prior results were tested. Teacher measures included: (a) categorizations of classroom behavior during each of nine observation periods, (b) Q-sorts of observer judgments following observation and (c) paper and pencil tests including EPPS and TPS. Pupil measures included regressed gain scores on CAT Reading and Arithmetic, Torrance "Circles" Test and questionnaire measures of anxiety and "Liking for School."

Results: (a) A sizable number of test measures predict dimensions of teacher behavior (magnitude .40). (b) Positive correlations between pupil achievement gain and the teacher characteristic —"stimulating" (magnitude .30 to .50) — both grades. (c) Positive correlation between "liking for school" and the teacher characteristic —"warm and permissive" (magnitude .45) — grade three only. (d) Positive correlation between pupil gain in anxiety and teacher overt affiliative behavior (magnitude .35) — grade one only. (e) Positive correlation between gain on "Circles-Originality" and the teacher characteristic —"stimulating." (magnitude .35) — grade three only.

12:15 to 12:50 P.M. SESSION 194 HEADQUARTERS

COMPUTER APPLICATIONS

CHAIRMAN:

Gilbert Austin, University of New Hampshire

PAPERS:

Computerized Selection of Test Items: SEQUIN

WILLIAM J. MOONAN,
U.S. Naval Personnel Research Activity, San Diego

This report describes a computerized item selection program called SEQUIN. This program can be used to determine if the number of items of a test can be substantially reduced without practically reducing certain desirable psychometric properties of the test such as validity and internal consistency reliability. Applications of this program indicate that, in certain cases, the number of items can be reduced by 70% to 80% with an increase in validity. This means that it is potentially very profitable to use such procedures as SEQUIN to analyze tests and testing programs.

The acronym "SEQUIN" stands for the phrase "sequential item nominator." The input to this program is a set of cards which indicate the responses made by a set of subjects to a set of test items. If required, the program will "score" the items of the test. Multiple correct responses may be used in the keys. Input also includes information about a set of ten or less criteria. Criteria may be of two types: Internal Criteria are scores, determined by this program, from the responses of part or all of the set of items. External Criteria are measurements available from the input cards, not necessarily determined from the responses to the test items. For example, internal criteria might be the "total score" or the score for key number 1. External criteria might be "final school grade" or "class standing." The program sequentially selects items, for each criterion separately, in such a manner as to increase the validity of the accumulated score for the "test" created by the item selection process.

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A Computer Analysis of Cliché Behavior in Student Prose

DONALD R. MARCOTTE, University of Connecticut (Ellis B. Page)

A computer program was written to search for and identify clichés used in essays. Two hundred fifty-six essays were examined using a computer program having three hundred clichés in the dictionary. The students wrote on the topic "The Best Things in Life are Free."

A total of seventy-four clichés were identified, with "in my opinion" occurring nineteen times, and "finer things" occurring fourteen times.

Other results are as follows: (1) Fewer than one-fourth of the students used clichés contained in the computer program dictionary. (2) The two clichés that appeared most often seem to evolve from the topic and the criteria established for the topic. (3) No significant differences were found in grades of students using clichés and those not using clichés.

The results obtained above could have been influenced by the selection of the clichés for the dictionary. Also, it is possible that spelling might have been a factor in the spotting of clichés because various words in the clichés that might have been misspelled would not have been identified.

Although several factors were not accounted for in the present program, the study did reveal that there was little overuse of textbook listed clichés in written expression of this high school group, a finding that deserves some attention in the field of English curriculum, as well as in the field of verbal data processing.

1:00 to 1:50 P.M. SESSION 203 DIVISION E

STUDIES OF STUDENT CHARACTERISTICS: I

CHAIRMAN:

Hubert Beck, City University of New York

PAPERS:

Differences Among Students Entering, Leaving, and Remaining in an Elementary Education Program

BERJ HAROOTUNIAN and MARIANNE BOBBIN, University of Delaware

This study attempts to identify differences among various types of elementary education majors. Four categories of elementary education majors are differentiated: students who begin and complete their degrees in elementary education; students who begin in elementary education but transfer to another degree program; students who begin as majors in other disciplines and transfer into education; and finally students who begin in elementary education but withdraw from school while still in good academic standing. Students dropped for academic reasons are not considered.

The sample for the study was drawn from female students entering the University of Delaware as freshmen in 1961 and 1962 and who completed their respective undergraduate degrees in 1965 and 1966. Students transferring from other institutions or who were reclassified downward were not considered.

Analysis of variance, chi square, and non-parametric statistics were used to test for significant differences among the four categories of elementary majors. Data on which the students were compared were derived from the Scholastic Aptitude Test (Verbal and Quantitative), the Brown-Holtzman Survey of Study Habits, the Allport-Vernon-Lindzey Study of Values, high school rank, and questionnaire items dealing with parents' educational level and the student's satisfaction with his choice of major. The results are considered in terms of Holland's theory of vocational choice. The implications for effecting change in education are also discussed.

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The Structure of Professional Self Conception in Prospective Teachers

HERBERT J. WALBERG, Harvard University

To determine the dimensions in which prospective teachers conceive themselves in the role of teacher, a semantic differential questionnaire was administered to 1,013 women preparing for teaching. The subjects rated the concept "Myself as a Teacher" on 26 scales. Principal components analysis with a varimax rotation revealed five factors: Brightness-Neatness, Goodness-Stability, Accessibility, Expressiveness, and Narcissism. Studies of *pupil* ratings of *teachers* (summarized by Stern) have typically yielded the factors Competence and Empathy, whereas Husek and Wittrock found a general evaluation factor, Goodness, and four factors suggesting various kind of rigidity — Restraint, Tenacity, Predictability, and Stability in *prospective-teachers'* ratings of the concept *Teacher*. In this study of *prospective teachers'* ratings of *themselves*, amalgamated dimensions were found: Brightness-Neatness and Goodness-Stability suggest the same cognitive and affective dimensions noted by Stern but they appear to be alloyed with constraining factors similar to those found by Husek and Wittrock. These factors are reminiscent of the emotional reserve and intellectual caution of the conventional stereotype of the teacher. The findings are related to the psychological problems of becoming a teacher.

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College Student Subcultures as Dimensions of Behavior

JONATHAN R. WARREN,
College Student Personnel Institute, Claremont, California

Three of the four college student subcultures described by Clark and Trow and two additional commonly described student types were the basis for descriptions of 18 hypothetical students which were rated for similarity by 688 college freshmen in three colleges. Multidimensional scaling led to the identification of five bipolar orientations to college that are considered more useful conceptual devices than are schemes of classification.

The five orientations were (1) academic commitment versus involvement off campus and questioning of the purpose of college, (2) personal independence versus involvement in traditional collegiate activities, (3) a view of college as occupational preparation versus a concern with social protest, (4) intellectual and esthetic concerns versus a conformist or dependent orientation, and (5) an undirected, confused approach to college versus a concern with self-development and identity.

Apart from conceptualizing students dimensionally rather than in categories, the study confirmed the relevance for students of the Clark-Trow academic, vocational, and collegiate subcultures, indicated the multiple nature of their nonconformist subculture, clearly distinguished intellectual from academic behavior, and confirmed the usefulness of the identity-seeking orientation described separately by Wedge and Pace.

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A Classification System for Discrete Pupil Behaviors

EDWARD E. GOTTS, RUSSELL L. ADAMS, and BEEMAN N. PHILLIPS,
The University of Texas

The manifest classroom behavior of grade school children has been repeatedly demonstrated to predict later personality adjustment and academic performance. Although manifest behavior has been shown to be important, data concerning it have not been gathered more widely from teachers primarily because of the difficulty of combining and interpreting discrete behavioral data.

A circumplex classification system originally conceptualized by Leary and Coffey (L-C) was used to summarize a possible maximum of 72 teacher nominations per child for specific classroom behaviors, which were selected for known research relevancy. Fifth graders (N = 468) from eight socio-ethnically diverse schools, which were earlier sampled in a USOE-sponsored longitudinal study, were thus scored for each of the eight L-C personality-behavioral dimensions; 224 pupils were typed into one of them. These latter were used to test the theoretical underpinnings, construct validity, and reliability of the L-C typology for elementary school children.

Adjacent L-C categories were combined to yield four predominant behavior types: (A) aggressives, (B) self-effacing dependents, (C) responsible conformers, and (D) manipulative controllers. Opposing types were then compared by analysis of variance on 17 independently obtained criterion measures. A's were significantly higher than C's on anxiety, feelings of inferiority, academic and social neuroticism, and peer rejection; C's were higher on school motivation, peer acceptance, school achievement, intelligence, and G.P.A. B's and D's were likewise compared. Hypotheses regarding school vs. type congruency, and type vs. coping adequacy were generally supported.

1:00 to 1:50 P.M. **SESSION 204** **DIVISION D**

EXPERIMENTAL DESIGNS

CHAIRMAN:

Frank B. Womer, University of Michigan

PAPERS:

A Paradigm for the Efficient Testing of Independence in Two-way and Three-way Contingency Tables with Fixed Marginals

AYRES D'COSTA and WILLIAM A. RODGERS, Ohio University, Athens

The chi-square technique is commonly used by behavioral scientists to test independence in contingency tables. Unfortunately, several instances have been noted of its misuse. Cochran (1954) emphasized the importance of the Freeman and Halton extension (1951) of the Fisher exact test when many expected frequencies in a contingency table are small. D'Costa (1966) examined recently published research and found that the exact test was not applied even in extreme cases where Cochran's "relaxed" rules (1954) were violated. Of the fourteen studies examined it was found that the exact test reversed the decisions for three. In other words, three of these fourteen studies had the wrong conclusion.

The exact test is time-consuming and is not always necessary. A search was made through the literature for different methods. A paradigm was developed so as to lead to a conclusive test of independence by the quickest method available. Several chi-square techniques were incorporated. The exact test was used only as a last resort. The techniques incorporated were: regular chi-square, Yates' correction, collapsing rows or columns, and the normal approximation to chi-square when its *df* exceeds 30. When the expected frequencies are small, the recommended modified formulae are used in each case.

The paradigm takes advantage of the following facts: (1) Yates' correction provides a conservative decision. Hence, when small expected frequencies arise, a decision to reject is final, but a decision to accept must be checked further by the exact test. (2) Collapsing rows or columns provides a conservative decision. (3) The regular chi-square is non-conservative.

The paradigm has been tested out with the help of an IBM 360 System by using the exact test as criterion and appears to be useful.

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Clarification of Predictor-Criterion Covariance When Each Domain Has Been Orthogonalized

JOHN A. JENSEN, Boston College

This paper describes advantages of a series of computational procedures employed in a study of curriculum practices in high school chemistry. The study was undertaken to investigate: (1) the extent to which measures of interest and aptitude characterizing students entering a year course in high school chemistry were related to achievement, and (2) the degree to which those relationships remained stable for two instructional methods and for males and females.

To clarify the distribution of covariance between predictors and criteria, each set was orthogonalized using component analysis and the varimax method of factor rotation. Factor scores were then extracted for each subject on each factor. By means of this technique the intercorrelation among the variables composing either the predictor or criterion domains was eliminated. Multiple regression analyses performed using orthogonal factor scores as raw scores produced weights equivalent to the zero-order correlations of each predictor with the criterion. The weights also represented the unique contribution of each predictor to the multiple correlation coefficient. The orthogonalization procedure thus made it possible to compute multiple correlation coefficients directly from the zero-order correlation coefficients of all predictors with the criterion.

It was observed that where predictor and criterion variables have been orthogonalized within their respective domains, the intercorrelation matrix of predictors with criteria has several useful properties. These are discussed together with findings from the study.

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The Measurement of Interaction in Factorial Designs

JASON MILLMAN, Cornell University

Interaction (nonadditivity) may be viewed graphically as nonparallel lines in which the dependent variable is plotted along the ordinate and a family of lines represents different levels of an independent variable. A function of the vertical distance between each plotted data point and its corresponding position in a "best fitting" family of parallel lines provides a measure of the degree of interaction present in the data.

Procedures will be discussed for determining a family of parallel lines which satisfy the following minimization criteria: (a) least squares, (b) minimize the sum of absolute deviations, (c) minimize the maximum deviation (minimax), and (d) criteria b and c with additional constraints upon the nature of the solution. Representation and (in some cases) uniqueness proofs will be provided for each procedure.

A randomization test based upon ranks in conjunction with criterion c will be proposed and a table of critical values of the test statistic supplied. Some ideas about a unit free measure of the amount of deviation of the data values from the additive solution will be expressed. The relation of this problem to the additive conjoint measurement problem will be mentioned.

Although the presentation is limited to two factor interactions, the procedures suggested are generalizable to higher order interactions.

A Source of Artifact in Multiple-Response Designs

TOM R. HOUSTON, The University of Wisconsin

When a subject is given a series of treatments or tasks to perform, progressive effects and treatment interactions may occur, making measurements on the dependent variables to some extent artifacts of the particular sequence in which the treatment or tasks were presented. For example, in rating studies intercorrelations between scales may vary inversely with the number of intervening scales on the rating sheet. Such artifact has been termed "proximity error."

Previous methods of controlling this error, all based on Latin squares, are reviewed. A variance index of the proximity bias of a set of sequences is proposed, and used to demonstrate that considerably less biased designs exist than are provided by existing methods. An empirically obtained table of such designs is provided for up to 25 treatments, and the use of this table is illustrated.

An important application of these results is to verbal questionnaire items. It is suggested that the mechanical difficulties of arranging the same items in many different sequences be solved by having an electronic computer print out the actual response sheets, with items appropriately ordered.

1:00 to 1:50 P.M. **SESSION 205** **DIVISION C**

CONCEPT LEARNING: IV

CHAIRMAN:

Ruth Formanek, Hofstra University

PAPERS:

The Effect of Various Training Techniques on the Acquisition of the Concept of Conservation of Substance

EGON MERMELSTEIN, EDWINA CARR, DOROTHY MILLS, and
JEANNE SCHWARTZ, Hofstra University

The objectives of this research were to ascertain whether various training procedures can influence the acquisition of the concept of conservation of substance. It was hypothesized that Smedslund's cognitive conflict training will influence the acquisition of the concept of conservation whereas Bruner's language activation training, Sigel's multiple classification training and Beilin's verbal rule instruction training will not.

Subjects were randomly assigned to two control conditions and four training conditions. This random assignment was made with certain restrictions. First, equal number of males and females were assigned to each condition. Second, only white children were used. The purpose of these restrictions was to control for the possible interaction with sex and ethnic effects.

Measures were taken of performance on verbal and non-verbal conservation tasks. These measures were taken one week, one month and three months after the training period.

The findings indicated that the cognitive conflict hypothesis is rejected, whereas the other hypotheses are supported. Acquisition of the concept of conservation as a function of other factors than specific training is discussed.

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An Investigation into the Development of Primary School Children's Meanings About Force, Speed, and Weight

RONALD RAVEN, State University of New York at Buffalo

The purpose of this study was to determine the interrelationships of the development of primary school children's descriptive terms about speed, force, and weight. One hundred and sixty subjects from the kindergarten, first, second, and third grades were asked to label pairs of carts that independently varied with respect to speed, weight, and force. There was an increase with age in the denotative discrimination of the terms that are correlated on the semantic differential. The kindergarten and first grade children offered more contaminated responses for the various dimensions of the physical materials than did the second and third grade children.

In the second part of the experiment, the speed, weight, and force variances were associated with two different rules. One cart followed the rule that heavier things go slower and the other cart followed the rule that heavier things go faster. The subjects were required to apply labels to the different stimulus dimensions of the two carts governed by the different rules. The data indicated that the ability to do this is a function of age.

It would appear that during the child's development a general concept involving many dimensions may be formed initially and then differentiated into components.

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The Effect of Perceptual Training upon the Discrimination of Relativity of Position and Motion in Primary School Children

HERBERT F. STRUBING, New York State University at Buffalo (Ronald Raven)

The general question was: Can second-grade children's learning from the Science Curriculum Improvement Study unit on *Relativity of Position and Motion* be enhanced by prior exposure to (a) the Frostig Program unit on *Perception of Spatial Relationships,* or to (b) the Frostig Program unit on *Visual-Motor Coordination*? The subjects comprised the nine second-grade classes in the Dunkirk Public School System, Dunkirk, New York.

Each class was divided into three groups. One group had the *Perception of Spatial Relationships* unit prior to *Relativity.* The second group had the *Visual-Motor Coordination* unit prior to *Relativity.* The third control group had no advance perceptual training. The data, calculated by two-way analysis of variance, indicated that the groups with prior perceptual training scored statistically higher on the final test on *Relativity of Position and Motion* than did the control group at the .05 confidence level. The effect of teacher differences was negligible.

The implication of the results of the study is that advance training in perceptual skills can increase the amount of understanding by second-graders of the concept of relativity as put forth by the SCIS Program experimental unit on *Relativity of Position and Motion.*

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Some Factors Related to the Conservation of Illusion-Distorted Length by Primary School Children

FRANK B. MURRAY, University of Minnesota

After 31 kindergartners, 32 first-, and 46 second-graders had selected two sticks of equal length, the sticks were made to look unequal by the Müller-Lyer illusion. A child conserved length if he saw the illusion, and despite it, maintained that the lengths of the sticks were the same. Subjects were asked to describe how seven stimuli looked and how they really were. Length conservers were significantly superior to nonconservers in discrimination of the real from the phenomenal aspects of the four stimuli that involved length, but were not significantly different from nonconservers in the discrimination for the three stimuli that did not involve length.

Subjects were allowed first to use one of the two equal sticks that looked unequal in the Müller-Lyer illusion and then if they wanted to, the other stick, to fish a coin from a cage. A child failed to conserve the length of the sticks if he refused or used the second stick and said he did because it was longer or shorter than the first stick. A significant number of children who conserved length in the first part of the experiment did not conserve it here. The implications of the findings for education were discussed briefly.

1:00 to 1:50 P.M. **SESSION 206** **DIVISION D**

RESEARCH ON SPECIAL GROUPS

CHAIRMAN:

David A. Payne, Syracuse University

PAPERS:

Multivariate Analyses of the Written Language Abilities of Educable Mentally Retarded and Normal Children

G. Phillip Cartwright, University of Hawaii

The problem is the identification of the nature and extent of hypothesized differences in the written language abilities of educable mentally retarded (EMR) and intellectually normal children.

Written compositions on the same topic were obtained from 1,500 EMR and normal children. Random sampling stratified on age, sex, race, and socioeconomic status was employed to yield three groups of 80 children each: an EMR group, a normal control group equivalent in mental age to the EMR group, and a normal control group equivalent in chronological age to the EMR group. Written language abilities were measured by composition and sentence length, type-token ratio (TTR), percentage of usage of different parts of speech, a grammatical-correctness index (GCR), and a spelling-correctness index (SCR).

Scores of subjects on ten language measures were analyzed by univariate and multivariate analysis of variance, canonical correlation, and multiple discriminant function analysis.

In general, the analyses revealed significant differences among the three groups in the ten-variable test space. The variables making the greatest contribution to the total variance were sentence length, TTR, and GCR. These findings suggest that the retarded were less productive, more redundant, and less grammatically correct than the normal children.

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The Factor Structure of Verbal Abilities of Blind and Sighted Children

M. H. Tillman, University of Georgia (W. L. Bashaw)

The purpose of the present investigation was to describe the performance of blind and sighted children on the Verbal Section of the WISC. Performance was evaluated in terms of factor comparisons between subtests using items as variables. Specifically, the emphasis was placed on developmental aspects of performance. Do blind and sighted children of similar age and sex perform equally well on the WISC Verbal subtests? Do both groups have comparable factor structures?

Results for each subtest included test statistics, tetrachoric inter-item correlations, and principle components factors with varimax rotation. The obtained factor structures were quite similar; however, the communalities for the blind on all subtests except Arithmetic were low. The application of factor analysis to the tetrachoric inter-item correlations for each of the WISC Verbal subtests can most parsimoniously be described by a proximity-difficulty pattern. In terms of educational objectives, there are several conclusions to be made about the blind. First, there appears to be a lack of integration among educational experiences with the result that each bit of knowledge is isolated and cast into a separate frame of reference. Second, verbal abilities focus on a basic vocabulary without much elaboration. Third, the blind tend to approach abstract conceptualization problems from a concrete and functional level and consequently lag behind the sighted children. And finally, the blind are quite comparable to the sighted in numerical ability.

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Similarities and Differences in Linguistic Code Behavior of Deprived and Nondeprived Children

L. EUDORA PETTIGREW, University of Bridgeport

The purpose of the investigation was to identify empirical measures of similarities and differences in language behavior which characterize the linguistic codes of deprived and nondeprived first grade children.

Predictor variables of social status and intelligence were obtained from a descriptive sample of 58 Ss, and a validation sample of 102 Ss. Functional criterion variables (syllables, words, response latency), and conceptual criterion variables (response category) were obtained with two types of pictorial stimuli. From statistical analyses of the descriptive sample's results, ten hypotheses were derived and tested with the validation sample.

Results indicated that (a) a lack of dissimilarities in functional criterion variables between deprived and nondeprived subjects on 35 of 40 stimuli; (b) on the five validated stimuli, the nondeprived sample manifested more variance on the functional criterion variables than did the deprived sample, and (c) identification of human behavior stimuli seems more related to social status than does identification of animal stimuli.

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Analysis of Clinical Data by Means of Multiple Contingency Pattern Frequency

LOYAL W. JOOS, Oakland Schools, Pontiac, Michigan

Clinical data compiled from the files of the Psychological Clinic of Oakland Schools were used to test the hypothesis that certain patterns of clinical behavior discriminate between Brain-Damaged Children and Emotionally Disturbed Children.

A list of 12 different items of clinical behavior was compiled. For each subject in the two samples used to test the hypothesis, the data consisted of the presence or absence of the 12 items. The items are not mutually exclusive, and it was assumed that any sub-set of the 12 items could occur as the clinical pattern of a child.

Since the record for each item consisted of the notation of the occurrence or non-occurrence of that item for a child, the total number of mathematically possible patterns is given by $P = 2^{12} = 4096$. In order to reduce the problem somewhat, the 12 items were taken 8 at a time by selecting the 8 items which actually occurred in the data most frequently. The reduced set allows a maximum of 256 patterns.

The data was analyzed by means of a computer program which reduced each pattern to a geometric scale value (SV) by this formula —

$$SV = a2^0 + b2^1 + c2^2 + d2^3 + e2^4 + f2^5 + g2^6 + h2^7$$

where a, b, c, d, e, f, g, and h represent the 8 selected items and where each of the a - h is 0 or 1.

The frequency table of (SV) patterns was printed in a table of 16 rows and 16 columns, one table for each of the two samples — Brain-Damaged vs. Emotionally Disturbed. The frequency of pattern occurrence was then used to identify patterns which seemed common to one group but not to both.

2:00 to 2:50 P.M. **SESSION 211** **DIVISION B**

INSTRUCTIONAL OBJECTIVES AND THE TEACHER

CHAIRMAN:

Howard J. Sullivan, Southwest Regional Laboratory for Educational Research and Development

PAPERS:

Cognitive Objectives Revealed by Classroom Questions Asked by Social Studies Student Teachers

O. L. Davis, Jr., and Drew C. Tinsley*, The University of Texas

This study was designed to investigate the cognitive emphases of teachers' classroom questions. An observation schedule was developed which incorporated, among its items, the major categories of the *Taxonomy of Educational Objectives: Cognitive Domain.* Classroom questions were classified by attention to both the form and inferred intent of the questions as well as the nature of the pupil response elicited and its reception by the teacher. Ss were 40 student teachers of the social studies in junior and senior high schools. Data provided by the observation schedule were normalized and treated by ANOVA techniques. Results indicate that most questions asked by social studies student teachers are procedural in nature or require pupil memory (knowledge) and that higher order objectives are seldom behaviorally operational. These findings are related to other studies of teacher classroom behavior. Proposals are advanced to make use of these result, in social studies methods courses and in the supervision of student teaching.

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The University "Clinical Professor" as a Change Agent in Public Schools

Walter J. Blanchard and Thomas B. Goodkind*,
University of Connecticut

This study sought to determine the value and practicality of an adaptation of James B. Conant's notion of the "clinical professor" as an effective intermediary between the educational program of the university and that of the public school. Specifically, the study was designed to determine whether a "clinical professor" can have an impact in influencing the attitudes of teachers toward (1) instructional practices, (2) pupil-teacher relationships, (3) use of curriculum materials, (4) experimentation with instructional techniques, and (5) university resources.

The "clinical professor" has been teaching two elementary social studies classes on a daily basis during the school year, and has been involved in the school's total educational program as classroom teacher and curriculum leader and resource person. An important part of the program has been direct assistance to staff members (including beginning teachers) through in-service programs, informal discussions, and the provision of resources. New curriculum materials and instructional techniques have been developed, field tested, and demonstrated.

Basic research instruments for the collection of data are the Ryans' *Teacher Characteristic Schedule,* the *Minnesota Teacher Attitude Inventory,* a questionnaire developed for the study, and in-depth interviews.

Preliminary indications are that teachers working with the "clinical professor" have shown attitudinal changes toward instructional practices, university resources, and experimentation with instructional techniques.

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A Measure of Teachers' Perceptions of Bloom's Educational Objectives

HILTON M. BIALEK, George Washington University

The purpose of this study was to determine teachers' perceptions of the desirability or importance of a number of educational objectives as well as their estimate of the degree of success they have had in attaining these objectives. Bloom's cognitive and affective objectives were presented along with examples. A sample of 750 teachers were asked to indicate, on a four-point scale, the "imperativeness" or desirability of each objective for (1) "slow" learners, (2) "average" learners, and (3) "accelerated" learners. They were also asked, on another four-point scale, to indicate how successful they felt their school was in attaining the particular objective for each of the three learning groups.

Analysis of the results clearly indicated that the reference groups (slow, average, accelerated) determined teachers' perceptions of both desirability of and success in attaining the educational objectives presented. *No* objectives were rated "imperative" for slow learners by a majority of teachers; *all* objectives were rated "imperative" for accelerated learners by a majority of the teachers. Perceived success was highly related to the reference group variable and discriminations among objectives were relatively insignificant. Implications of these findings for teacher training and curriculum design are discussed.

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The Nurture of Teacher Growth and the Use of Facilitators

LOUIS J. RUBIN, University of California, Santa Barbara

[no abstract]

2:00 to 3:30 P.M. **SESSION 214** **DIVISION C**

EXPERIMENTAL STUDIES OF LEARNING AND PERFORMANCE

CHAIRMAN:

Alfred E. Hall, College of Wooster

PAPERS:

Meaning and Transfer of Verbal Learning

Julius M. Sassenrath and George D. Yonge,
University of California, Davis

Previous attempts to study meaning experimentally in transfer of learning have either confounded variables or have varied only the stimulus or response elements separately. With these shortcomings in mind, and with well controlled conditions, synonymity, antonymity, homonymity, and word association "meaning" were studied independent of one another between training and transfer in either the stimulus, response or both positions in paired associate lists. In training the stimulus, response, or both words (for three groups of 20 university *S*s) were varied in "meaning" in relation to the transfer task in six ways: unrelated, synonyms, antonyms, homonyms, associates and identical. The experiment was a three lists by six "meaning" design with between *S*s for lists and within *S*s for meaning. Analyses of variance indicated that there were reliable differences in transfer among lists and among meaning conditions. Scheffé's confidence interval procedure indicated that there was greater transfer for homonyms and associates than for synonyms and antonyms. The discussion focuses on preference, response-chaining and representational mediation hypotheses as well as similarity of meaning in transfer of learning.

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Introductory Materials as Facilitators of Transfer

Arden Grotelueschen, Teachers College, Columbia University, and
Douglas Sjogren, Colorado State University

Two similar experiments were conducted to study the hypothesis that the effectiveness of materials studied as an introduction to an unfamiliar generalizable learning task, on the learning of the task and the ability to make generalizations, is positively related to the extent to which the introductory materials teach or review those principles that are relevant to the new learning task. One experiment was conducted with a sample of graduate students, and the other with a sample from a population of adults. A second hypothesis for the experiments was that the ability to generalize from the learning task is curvilinearly related to the organization of the learning task.

Subjects were assigned at random to one of four introductory material conditions and one of three conditions of organization of the learning task. The introductory conditions were the study of approximately 75 frame linear programs on principles of number systems, the base seven system, the base ten system, or the history of measurement. The learning task was to learn symbols that represent quantities in the base four number system. The paired-associates task was presented in serial order on a memory drum; the first five symbols in serial order and the rest randomly, or completely randomly.

The hypotheses were partially supported by the data with some interaction with intelligence level observed.

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Point of Maximum Learning as a Function of Difficulty of Materials

JOHN R. BORMUTH, University of Minnesota

It seems self evident that when verbal instructional materials are too difficult or too easy, students will learn less from them than when the materials are at some intermediate level of difficulty. This was a preliminary study designed to determine (1) if a point of maximum learning (PML) exists when learning is plotted as a function of difficulty and (2) if the PML remains stable from one set of materials to another. In this study the difficulty of materials was expressed for a subject as the proportion of items he answered correctly on a cloze test over the materials. Learning was taken as the difference score, corrected for regression effects, on a multiple choice test given before and after the subject had read the passage. To avoid some of the carry over effects the cloze test was given to one subject and the multiple choice tests to another subject who was matched on a reading achievement test score with the other subject. After plotting the learning against the difficulty scores for twenty-five pairs of subjects, a curve was fit to the plot. The point on the curve where the slope was equal to zero was taken as the PML. The PML's of two sets of materials were compared to determine if they differed.

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Learning Ability and Retention

THOMAS J. SHUELL and GEOFFREY KEPPEL,
University of California, Berkeley

The purpose of this study was to determine whether fast and slow learners differ in rate of forgetting. For such investigations it is necessary to insure that subjects have attained the same level of performance before the start of the retention interval (cf. Underwood, 1964). Previous research by the present authors has shown that free-recall performance of fast and slow learners is comparable when the list is presented at a 1- and 5-sec. rate, respectively. In the present study fifth-grade children were all given a pretest at a 2-sec. rate.

Fast learners were those above the median; slow learners those below. Two weeks later a new list was presented for free recall at a 1-sec. rate for the fast learners and at a 5-sec. rate for the slow learners. After the recall test half of the subjects in each ability group was given an immediate test to control for potential learning on the first recall test. The other half recalled the words again after 24 hours. While both groups showed significant forgetting over the 24-hour interval, the two groups did not differ significantly from one another on either the immediate or 24-hour test. It was concluded that when subjects are equated for differences in degree of original learning individual differences in retention are minimal.

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Digit Cancellation as a Measure of Reactive Inhibition with Elementary School Children

WAYNE OTTO, The University of Wisconsin

In studies where the subjects were elementary school children and the experimental task used to quantify reactive inhibition was inverted digit printing, rapid accumulators of reactive inhibition generally have been poor achievers in school subjects. However, when Schoer used a digit cancellation task with college students, rapid accumulators of reactive inhibition made fewer errors than slow accumulators on a criterion task. Whether this discrepancy in results is due to differences in subjects, experimental task used to quantify reactive inhibition, or nature of the criterion task is a matter for speculation. Therefore, 72 elementary pupils — equal numbers of good and poor readers in grades, 4, 5 and 6 — were studied to determine whether predictions would hold when the task used to quantify reactive inhibition was digit cancellation rather than inverted digit printing. The reasoning was that if the experimental tasks are interchangeable at a selected grade range, then the suggestion that the nature of the criterion task is the crucial factor would bear more careful scrutiny. But the predicted and fairly stable relationships found with inverted digit printing were not demonstrated with the digit cancellation task. Thus, Schoer's results may have been merely a function of the experimental task employed and not a function of the criterion task.

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The Effects of Rules-of-thumb on Transfer of Training

TRACY H. LOGAN and KENNETH H. WODTKE,
The Pennsylvania State University

A rule-of-thumb was added to an instructional program designed to facilitate transfer to problems which were not specifically taught in the program, and to which the rule did not apply. The presence of the rule produced a marked decrement in performance on the transfer tasks. Only 20% of the students who were given the rule achieved perfect scores on a transfer test, while 75% of the no-rules group achieved perfect scores! The transfer decrement occurred in spite of the fact that the students were given several didactic warnings indicating that the rule *would not apply* on the transfer problems. The didactic verbal warnings had little effect on student behavior in the transfer problems. The poor performance of the rule-groups appeared to result from their misuse or overgeneralization of the rule. The writers believe that these results are fairly typical of actual classroom teaching practice, and that great care should be taken preparation instruction which involves the use of rules-of-thumb in problem solving.

3:00 to 3:50 P.M. SESSION 220 DIVISION C

RESEARCH IN LANGUAGE ARTS

CHAIRMAN:

Nancy Modiano, New York University

PAPERS:

Phonetic Generalization in Spelling

ALBERT H. YEE, ETHEL E. VOIGT*, and THOMAS D. HORN,
University of Texas

Student teachers (N = 106) and their pupils in Grades 2-6 (N = 2,858), Austin, Texas, were grouped according to Solomon's Four-Group Design, a "true" experimental design, to test the null hypothesis that achievement tests will be independent of phonetic instruction in spelling.

Such a design helps to overcome threats to internal and external validity. Teacher variability was controlled by computing class proportions, holding separate meetings for each of the four groups, providing experimental Ss uniform grade-level lessons, and withholding information concerning the main purposes of this study. Tests of group and boy-girl proportions of right responses found no differences between group proportions with z values greater than .77, and the average was about .30. F ratios were insignificant.

Such results indicate that instruction of the phonetic generalizations did not produce any significantly greater spelling achievement.

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Structure of Written Composition

RACHEL S. SUTTON, University of Georgia

This study is based on these beliefs: only in the largest context, the whole composition, can structure be usefully contemplated; good writing demands competence with the patterns of language and sensitivity to aspects of style; good writing can be taught in the elementary school; examples of fine prose and poetry found in the books for children constitute a valuable source of instructional materials.

Two hundred fifty books recommended by a competent jury, representing different types of children's reading material, such as folk tales including fairy stories, fables, myths, and epics, poetry, fiction, biography, and information were selected for kindergarten through grade six. The books were analyzed for appropriate examples of structural elements in composition: vocabulary and diction; sentences and sequencing of sentences; paragraphs; clarity, unity, and balance within the total composition. The illustrative samples were tabulated, and categorized. They are now being used with elementary school children in experiments to examine the child's sequential understanding of language structure and use in written production.

Developing Syntactic Control in Seventh Grade Writing Through Audio-Lingual Drill on Transformations

William J. Griffin, George Peabody College for Teachers

Two experiments indicate that audio-lingual training in producing sentence-combining transformations can lead seventh graders to expand use of complex syntactic structures in semi-formal writing. In the first, completely aural-oral training in twenty one-hour sessions systematically familiarized Ss with fifteen structures uncommon in children's speech. Oral reading introduced transformational analysis and practice in combining kernel sentences. Identical pre-tests and post-tests (written responses to a silent movie) showed a group gain in use of structures taught that narrowly missed statistical significance at the .05 level, though most of it was attributable to one-third of Ss. The second experiment used similar techniques, but doubled the number of training sessions, introduced twenty-three transformations, compared Ss with a control group, and measured effects differently. Measures were mean length of T-units (independent predications with any grammatically attached subordinate clauses) and ratios of sentence-combining transformations to T-units. Ss showed significantly greater gains (.05 level) than the control group; again, individual variations were extreme.

Development in vocabulary and oral reading were notable incidental effects. Further investigation may show whether audio-lingual drill is useful in lower grades and whether individuals who will profit from such training may be diagnostically identified.

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An Experimental Study to Determine the Efficacy of Specific Training in Listening

Albert M. DeSousa, Scotch Plains–Fanwood Public Schools,
New Jersey; and
Milly Cowles, University of Georgia

Problem was to determine efficacy of teaching listening skills by training in purposive listening. Ninety seventh-grade pupils were selected from a population of 273. Subjects were assigned to three groups: one-third *experimental* who received listening training; one-third *isolated control* who received instruction in literature; one-third to *control* who received no treatment.

One week prior to experiment and one week after experiment, the three groups were tested on Form 3A and Form 3B of *Sequential Test of Educational Progress: Listening Test*. Results of the analysis of variance based on differences among pre- and post-test scores for the three groups showed an *F*-ratio significant beyond the .01 level. The *t*-ratios were significant beyond .01 level, between the experimental and isolated-control groups, and between the experimental and control groups. No significance was obtained when the isolated control and control groups were compared. Clearly, the experimental group profited from training in purposive listening.

3:00 to 3:50 P.M. **SESSION 221** **DIVISION C**

ANXIETY

CHAIRMAN:

E. Vaughn Gulo, Northeastern University

PAPERS:

The Interaction of Sex of Teacher and Sex of Pupil as a Factor Affecting Teachers' Rankings of Pupil Anxiety

DONALD J. TREFFINGER and RICHARD E. RIPPLE,
Cornell University

A self-report anxiety measure was administered to 215 sixth-grade pupils. Pupils' scores were ranked and correlated with rankings made independently by their teachers (five men and five women). Correlations were obtained between test and teacher ranks for each teacher's entire class, and then separately for boys and girls. The correlations for same-sex rankings were more often greater than correlations for opposite-sex rankings. For each teacher, correlations tended to follow the pattern: same-sex ranking (highest), total class ranking (middle), opposite-sex ranking (lowest). Mean discrepancies between test and teacher ranks were significantly lower for male teachers than for female teachers, regardless of sex of pupil. There was also a significant interaction between sex of teacher and sex of pupil. Less mean discrepancy existed between test and teacher ranks when male teachers ranked male pupils, and when female teachers ranked female pupils, than when opposite-sex pupils were ranked. Results are interpreted on the basis of role theory, sex roles in American culture, and the nature of empathy responses.

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Sex and Socio-Cultural Differences in Relationships between Measures of Early School Experience and School Anxiety and Neurotic Anxiety in Fourth Grade

BEEMAN N. PHILLIPS, The University of Texas

The importance of success and failure experiences in the early school years is attested to by studies emanating from several different theoretical orientations, and in this study measures of success and failure in Grades 1-3 were used as predictors of school anxiety and neurotic anxiety in fourth grade. Data were obtained as part of a larger USOE-supported study of approximately 500 Ss in which a measure of neurotic anxiety was derived from Cattell's research, and a questionnaire measure of school anxiety (i.e., anxiety arising, at least in part, in threatening school situations) was conceptualized, developed, and empirically validated through factor analytic and other techniques, and in which information from the cumulative record was used to estimate the degree of school success in Grades 1-3. Among the major findings were the following: experiences in Grades 1-3 were more related to school anxiety than to neurotic anxiety; early school experiences were more predictive of school anxiety in girls than boys, and in Anglo than Non Anglo (Negro and Spanish-speaking) children; experiences in Grade 1 frequently were as predictive of school anxiety as experiences in Grade 3 (especially for Non Anglo children); and indicators of school conduct were differentially predictive of school anxiety among the subgroups studied. Finally, implications of the results for psychoanalytic and other conceptions of anxiety are discussed.

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Problem Sensitivity in Elementary School Children

Jerome S. Allender, Miami University, Oxford, Ohio

The focus of the research is a set of inquiry materials entitled, *I Am the Mayor.* The materials are modeled after the Teacher's "In-basket" developed by Shulman. The research reported here is part of a larger study to evaluate the ability of elementary school students to use inquiry materials in studying community life. Fourth, fifth, and sixth grade students were given work which requires them to uncover embedded problems and to search for information on those problems which they feel are important. Their inquiry behavior is scored for problem sensitivity, problem formulation, amount of search, and openness of decision. The existence of polar types can be demonstrated by looking at the scores for two groups composed of five children which are comparable on measures of intelligence and reading level. The children were selected from a study of 28 for being among the highest and lowest on problem sensitivity. Curves constructed from scores on ten units of work are very different for formulation and search behavior. Only the decision scores are not sharply differentiated. Consistent with Shulman's findings for teacher trainees, the five students selected to be high in problem sensitivity spent characteristically more time inquiring.

3:00 to 3:50 P.M. **SESSION 222** **DIVISION E**

STUDIES OF STUDENT CHARACTERISTICS: II

CHAIRMAN:

John C. Manning, University of Minnesota

PAPERS:

Student Challenge of Teachers' Training

THOMAS W. WHITELEY, University of Saskatchewan

This study was conducted in a large city school system in a Western state. A random sample of 725 high school students was selected from representative schools.

The data were collected by questionnaire and analyzed to determine the proportionate number of students who: openly challenged a teacher, chose classrooms or privacy for the confrontation, found teachers reacting favorably, and found satisfaction in their endeavors. Chi Square was used to test for significant differences between the sexes and places of occurrence.

Results indicated that seventy-one per cent of the students, mostly boys, did challenge their teachers. Seventy-five per cent of the challengers (both sexes) did so in class, but the girls preferred a private confrontation. There was approximately a three-to-one ratio between public and private confrontations. Sixty-six per cent of the challengers found a favorable teacher reaction. More girls than boys found this true in the classrooms, whereas no differences were noted between the sexes for private confrontations. However, the boys perceived a more favorable reception in private than in the classroom. Seventy-two per cent of the challengers, both sexes, gained self-satisfaction from their efforts.

* * * *

Reference Group Influence on Disadvantaged Students Who Volunteer for Economic Opportunity Programs

EDSEL L. ERICKSON, Western Michigan University,
ALBERT RITSEMA, Grand Rapids (Michigan) Public School System,
WILBUR B. BROOKOVER, Michigan State University, and
LEE M. JOINER, Hofstra University

Controlling for intelligence, race, and sex, comparative findings are presented on academic role obligations of student-parent, student-friend and student-teacher relationships for: (1) economically disadvantaged students who volunteered for federally sponsored Work-Training Programs; (2) economically disadvantaged students who did not volunteer for these programs; and (3) economically advantaged students. The population included 16 year old tenth and eleventh graders ($N = 700$) in the public schools of a midwestern city. Instruments were administered to students prior to the announcement of a Work-Training Program. Subjects were classified as advantaged or disadvantaged by school personnel according to the criteria of the Office of Economic Opportunity.

Findings failed to support hypothesized differences in the perceived academic evaluations and expectations held by parents, friends and teachers for "poor" students who volunteered and "poor" students who did not volunteer for poverty programs. It appears, however, that both categories of "poor" students tend to perceive their parents, friends and teachers as holding lower academic requirements for them than do their more affluent peers.

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Personality Characteristics of Students and Faculty in the College of Engineering

Mary C. Regan, University of California, Davis

Entering freshmen in the College of Engineering are different from entering students in other colleges and majors. The meaning of these differences take on new dimensions when seen in relation to the faculty with which they deal. What personality "types" make up the teaching environment and in what ways are these "types" related to the characteristics of engineering students?

Sixty-one faculty members and 253 engineering students at a major university were tested using the *Omnibus Personality Inventory* (O.P.I.). ANOVA of the profile data (Greenhouse and Geisser) revealed significant differences in "shape" and "level" of student-faculty profiles. Duncan's multiple-range test with Kramer's extension for unequal N's was used to test specific group differences.

Profile "shapes" indicate that students and faculty in the College of Engineering tend to be very similar in their intellectual and motivational orientations toward learning. However, faculty are significantly more theoretical and interested in the world of ideas than are their students. The students are more authoritarian than their faculty, they are more practical, and are less intellectually liberal, less flexible, and less altruistic. Students are also less stabilized which provides some possibility for motivated personality growth and change.

These findings have implications for student recruitment, curriculum development, and faculty-student "fit."

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Self-Perceived Changes in Attitudes and Values Associated with College Attendance

Irvin J. Lehmann, Michigan State University

This is a study of the impact of college on changes (self-perceived) in attitudes, values, beliefs, and opinions.

An instrument especially constructed for this study was administered in 1962 to subjects who had entered Michigan State University as freshmen in the Fall of 1958. Those Ss who withdrew from MSU were sent the inventory by mail. The data were analyzed separately for the males and females. Chi square was used to test the hypotheses.

The major findings were:

1. A majority of the males and females, regardless of amount of college education, indicated that they had undergone some change in their attitudes, values, opinions, and beliefs between 1958 and 1962.

2. A small percentage of the subjects changed in what might be termed a negative direction. For example, some of the Ss indicated that they became *less* tolerant of people differing in race, creed, color, or religion.

3. A sizable proportion of both males and females, regardless of the amount of college education, indicated that they felt they had undergone no change in their views between 1958 and 1962.

4. Increased college attendance, for both males and females, was accompanied by an increase in the proportions who felt that they (i) developed more insight into the behavior of other people, (ii) became more interested in social issues, and in intellectual and cultural matters, (iii) developed greater ability to change their views in the presence of facts, (iv) developed less respect for rules and regulations, and (v) became more pessimistic as to the future of civilization.

Perhaps the most significant aspect of the study is the great similarity in self-perceived changes between college seniors and college withdrawals.

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